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ABSTRACT

A project to develop instructional and evaluative procedures for special classes of intellectually gifted students in grades four, five, and six was developed as part of California Project Talent. Two demonstration programs were observed over a 3-year period; the two classes were all-day, full-week programs for children with an IQ of 130 or over. The following aspects of the classes are described: administrative procedures and organization, selection of students, curriculum development oriented to the learners, provisions for professional education of teaching personnel, and evaluation by informal and formal measures. Recommendations are made for each of the areas discussed. A reference list cites 126 items. (SP)

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PROJECT TALENT
II
CALIFORNIA

special class

Programs for Intellectually Gifted Pupils

CALIFORNIA STATE DEPARTMENT OF EDUCATION
Max Rafferty—Superintendent of Public Instruction
Sacramento 1968

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PROJECT TALENT
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Programs for Intellectually Gifted Pupils

Prepared for

California Project Talent
State Department of Education

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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FOREWORD

Every child should have the opportunity to acquire a sound basic education, and the structure of the opportunity should be sufficiently flexible to permit the child to learn at the rate and to the full level his ability permits. Responsibility for the provision of this opportunity rests primarily with the public schools.

In addition to having this opportunity, every child should be helped to understand himself and to know his abilities and should be counseled regarding how he can utilize his abilities to best advantage. The provision of this help and counseling is a major responsibility of the schools, but one that must be shared by the home.

Ways in which the schools can meet these responsibilities, especially with gifted children, have been well defined by California Project Talent. And in addition, Project Talent has demonstrated ways in which special class programs of high caliber can be developed and operated with outstanding success.

This publication contains a report of California Project Talent regarding its findings in conducting special class programs for intellectually gifted pupils and recommendations regarding how similar programs may be developed and conducted by California school districts. Every school administrator and other professional educator should profit from studying the information and ideas presented.

Max Rafferty

Superintendent of Public Instruction

PREFACE

California Project Talent was initiated in 1963 by the California State Department of Education and was funded by the Cooperative Research Program of the Office of Education of the United States Department of Health, Education, and Welfare. The project was designed to demonstrate and evaluate four types of programs for intellectually gifted children: enrichment, acceleration, counseling-instruction, and special classes. This is a report of the findings of research consultants for the project on special classes. Their observations took place over a three-year period during the summer and during the school year, both in the demonstration centers at Lompoc and Davis and in school districts outside the project.

The proposal for the special class demonstration stated its purpose as follows:

> . . . to develop instructional and evaluative procedures for special classes of intellectually gifted pupils in grades four, five, and six. Instructional procedures would be designed to provide (1) direct experiences in the processes of problem solving; (2) insights into applications of facts and principles to descriptions or explanations of relationships; and (3) insights into how learning takes place. . . . The contribution of the center will lie primarily in demonstrations of a rationale of teaching and learning which, it is hoped, will enable the intellectually gifted to function ultimately in leadership roles.[1]

Two demonstration centers were selected: one in the Davis Joint Unified School District, where a special class program had been established and has now been in operation for about seven years, and the other is in the Lompoc Unified School District, where the first special class was organized in 1961. Both programs evolved from local needs and were distinctive in function, organization, and administration. Both programs qualified as demonstration centers for this project, as they involved intellectually gifted children and operated on a full-time schedule during the three years of the demonstration.

"Special class," as the term is used in this report, may mean any administrative arrangement by which a school segregates or groups superior learners for the purpose of instruction and learning. The special class model, as demonstrated in the two school districts selected for California Project Talent, was an all-day, full-week program for groups of children identified as gifted by the criterion of an IQ of 130 or higher. Other types of ability grouping or special class alternate programs that are being used in California are reviewed in Chapter 1. Research studies that pertained to special class groupings of bright and intellectually superior children at elementary school levels and that made use of objective data-based evaluations are also summarized in Chapter 1.

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[1] Joseph P. Rice and Paul D. Plowman, "A Demonstration Center with Differential Programming for Gifted Pupils in California in Grades One Through Nine: Enrichment, Acceleration, Counseling, and Special Classes," California Schools, XXXIV (May, 1963), 151-52.

Administrative procedures for the special class program for gifted children are discussed in Chapter 2. Emphasis is placed on the need for administrative planning and support if the gifted child is to secure the advantages inherent in the program. Factors that contribute to the high mortality rate of special class groupings at the elementary level are considered, with suggestions as to how they may be counteracted. Some of the problems are replacing trained and interested personnel who leave the program, lack of adequate evaluation procedures, cost and difficulty of securing the needed special materials, grading practices that appear to penalize pupils in special classes, and negative affective or attitudinal characteristics of adults.

Administrative organization in the two California Project Talent demonstration centers is outlined in Chapter 2. Administrators who anticipate inaugurating new programs are offered guidelines on such pertinent matters as the provision of materials, the individualization of instruction, the selection of teachers, and the acceptance of the program in the community. A prototype class is described in which the elements of success would be built in: children would be kept within their own schools; high-achieving and creative children would be included; the class would operate without labels; and it would use a team of teachers who also teach regular classes.

Screening and selection of pupils for special classes tends to be based on legislative criteria for state reimbursement of excess costs: a minimal IQ of 130 on an individually administered test is required, in most cases, to qualify a pupil for a special class for the gifted. The Davis demonstration center used the Wechsler Intelligence Scale for Children (WISC) in its selection process, and the Lompoc center used the Stanford-Binet Intelligence Scale. Some of the variations in special ability, apart from the IQ score, are discussed in Chapter 3. These fall into categories of social-empathic, artistic-creative, kinesthetic-mechanical, symbolic-structural, and verbal-receptive characteristics.

The process of curriculum development, one of the major functions of the demonstration project, is the subject of Chapter 4. Characteristics found to be common to most intellectually gifted children in the middle grades are listed, and each of the characteristic modes is followed by suggestions for classroom arrangements or procedures that can capitalize on these predominant patterns of behavior. Not all gifted pupils are highly motivated to produce academically or creatively, primarily because they have not learned to find satisfaction in their own productions. It is possible for the pupil to acquire creative self-direction if the teacher arranges creative activities in which the successful functions of the pupil are reinforced by rewards which give him pleasure. Many examples of this type of creative organization of content on the part of teachers are cited. Creative curriculum development was emphasized in the special class demonstration centers in reading, science, social science, mathematics, and art. A brief discussion of group counseling of special class elementary school children in Davis, conducted by the research project consultant, is also included in Chapter 4.

Professional education for teaching personnel involved in the demonstration centers was conducted through inservice meetings, workshops, and postgraduate courses for college credit; these are described in Chapter 5. After-school or afternoon meetings were held to review new materials, consider new techniques, and exchange views with others of similar professional interests. Resource specialists in academic subjects and the arts were invited to meet with project teachers and with groups of children. In 1964 and 1965 five-week statewide summer workshops that offered training in teaching the gifted child were initiated cooperatively in Sacramento by the Sacramento State College, the San Juan Unified School District, and the California State Department of Education. In these workshops, differential programs for San Juan pupils were opened to observers; a laboratory setting was provided for curriculum development or case study; and resource persons from specialized areas of gifted-child education gave lectures and held conferences. The topics and individual projects that emerged as vital during the Sacramento workshops were incorporated into a topical outline for the content of an education course on the gifted child.

Evaluation procedures that pertain particularly to special classes for gifted elementary school children are outlined in Chapter 6. They include both informal evaluation and measurements of pupil achievement by various tests. Informal evaluation was undertaken in all special classes at all levels. Measurement of achievement as used in the studies by Ruth A. Martinson provided a good example of test selection and data treatment.[2] Longitudinal followup studies were conducted in Davis to determine the effect of the special class program on the children who participated. In the Lompoc program, appraisal by an outside observer was selected as the procedure for evaluating the honors program in grades four through six. Two goals of the special class programs, changes in intellectual functioning and evidence of talent development, were found difficult to evaluate. Some suggestions are made in this report regarding the research needed to develop instruments and procedures for the complex evaluation of cognitive and affective behavior.

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[2] Educational Programs for Gifted Pupils. (A Report to the California Legislature Prepared Pursuant to Section 2 of Chapter 2385, Statutes of 1957, by the California State Department of Education. Roy E. Simpson, Superintendent of Public Instruction; Ruth A. Martinson, Project Coordinator.) Sacramento: California State Department of Education, 1961. A study of educational programs for gifted pupils, authorized by the California State Legislature in 1957, was undertaken during the years 1957 to 1960, with Ruth A. Martinson as project coordinator. This study is referred to in this report as the California State Study.

Recommendations, summarized in Chapter 7, are based upon the pertinent experimental research, the social and educational climate in California, and the accumulated experience in the special class demonstration centers of Project Talent. Each school district may be expected to plan and implement the kinds of special programs that seem best suited to local conditions.

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Chapter 1

Special Class Programs and Research

The special class prototype selected for California Project Talent was an all-day, full-week program for groups of children identified as gifted based upon the state criterion of a minimum IQ of 130 on an individual intelligence test, such as the Stanford-Binet scale. Several types of special class organization are used in California, some of which are identified for state reimbursement of excess costs as programs for mentally gifted minors. A study of these various programs, as well as an examination of research reports relevant to special classes, was a part of the pertinent research conducted by those responsible for designing the special class prototype.

Ability Grouping

The practice of ability grouping increases generally as pupils progress upward in the grades and as the range of pupil achievement increases. Although grouping cannot be expected to accomplish homogeneity, certain procedures for the selective assignment of pupils tend to reduce the range of talent within a class and to increase the proportion of instruction at the pupils' own levels. One classification of many possible special class arrangements for academically superior pupils is based on the time the pupils spend in the program. Some programs, other than the full-time organization of the demonstration centers, are the following: special instruction groups, sectioning classes, special interest groups, ungraded classes, extra classes, and special summer programs.

Special Instruction Groups

Usually when pupils are grouped for particular content areas, the arrangement covers a time interval ranging from one instructional period to half of the school day, and from one meeting a week to daily sessions. By means of this plan the gifted child may spend part of the school day in a typical heterogeneous homeroom which offers instruction in areas such as language arts, physical education, and social sciences. The other half of the day might be spent with his intellectual and academic peers using advanced curricula in other content areas such as mathematics, science, or social science. Some districts, for example, Monterey City Elementary School District, conduct the special class groups two afternoons each week and use a unit approach to the study of an appropriate topic in the humanities.

Sectioning Classes

Sectioning classes according to the pupils' achievement potential is practiced in nearly all comprehensive high schools and to some extent in most junior high schools. However, grouping by ability levels is rarely done in elementary schools, at least not to the extent that a high-ability class could be called a special class for gifted children, although grouping is often practiced within a class for reading and arithmetic. One of the disadvantages of sectioning at the elementary school level is that assignment to sections is usually based upon group tests, an economic necessity that serves to underrate both the slow reader and the creative pupil and to overrate the fast reader and the articulate pupil.

Special Interest Groups

Extracurricular or cocurricular programs, such as science fairs, hobby clubs, and special projects, are sometimes arranged for interested pupils. Usually conducted on a volunteer basis outside of school hours, these bring together children with common interests. Art activities, music, natural science, school newspapers, and puppetry are typical interests that bring teachers and pupils together on a regular schedule outside of school hours. The Pasadena City Unified School District conducted a Saturday science laboratory on a voluntary basis as part of its gifted child program. The Hope Elementary School District in Santa Barbara financed an after-school project which brought resource personnel from such divergent disciplines as philosophy, geology, and marine biology to talk to the children and to initiate group discussions and related activities.

Ungraded Classes

Ungraded classes or combined grades at primary or intermediate levels enable pupils to progress at their own learning rates, in contrast to the one-grade-each-year progression. Heterogeneity is reduced by reassigning pupils to faster (or slower) moving groups in any curricular area at any time during the school year when evaluation indicates that the child no longer fits within the instructional range of his group. Combined grades can be used also to give the gifted child a chance to work with subject content for advanced pupils prior to reassignment and then to progress to an advanced group with his age peers of like ability. Use of the ungraded organization permits the school to "cluster" in a special class two or more groups of children identified as gifted and possibly a few high achievers without having to transport pupils to another school and without raising difficult issues of school reorganization. If the instruction in the ungraded class is highly individualized and is geared to the kinds of intellectual functions that gifted children enjoy, some individually selected grade-four pupils may be combined with grades five and six children. The ungraded or combined grade arrangements are flexible and easily administered.

Extra Classes

Less common in elementary schools than in secondary schools is the extra class offered for pupils who are able to carry an additional load. Extra subjects, such as a foreign language or instrumental music, are made available for these pupils. Usually the children are expected to make up the work they miss by attending the extra class held outside their regular classroom. Extra classes have the advantage of attracting intellectually able pupils without restricting enrollment to them. For example, this plan enables children to study a second language for several years prior to its usual provision in the curriculum for their class. The Goleta Union Exementary School District offers French as an extra class at eight in the morning for volunteers from grade one and higher. The plan has the disadvantage that quantity of work rather than intellectually different content becomes the model for curricular adjustments.

Summer Programs

Another version of the special class for gifted children is the five- or six-week summer session. This program can offer many classes of special interest to gifted children in much the same way as classes in music, art, or literature provide interest for children with specialized talents. Because of the voluntary nature of the program and the fact that supplementary curricula are involved, the summer programs have had good community acceptance compared with some other forms of special classes.

Special summer sessions were conducted in California Project Talent for accelerated pupils who were moving from grade two to grade four. These summer programs constituted a special class for gifted children and were planned with their intellectual characteristics in mind. In the Ravenswood City Elementary and San Juan Unified school districts, the summer programs for gifted children enrolled those who were being accelerated and also those who were being recommended for an enrichment program. Summer classes in humanities and literature or in mathematics and science were offered for gifted pupils in the San Juan Unified and in the San Bernardino City Unified school districts, as well as in schools in the San Fernando Valley and other areas. Special classes for the gifted which combined instruction and group counseling were demonstrated in the teacher education workshop sponsored cooperatively by Sacramento State College, the San Juan Unified School District, and the California State Department of Education. Summer programs offer many advantages, including the availability of abundant materials from higher grade levels; highly selected teaching staffs; flexibility of schedule, enabling extensive use of tours and resource persons; relative freedom from standard curricula; and the use of specialized approaches to learning.

Special Class Emphasis

Whichever organizational plan is selected for grouping gifted children into special classes, the program should emphasize the children's participation at appropriate levels of interest and competence. Cluster groups of gifted children in the Los Angeles demonstration center began their enrichment work two grades higher than their regular grade placement and proceeded to as high a level as they were able to achieve comfortably. Such adjustments can occur when adequate inservice work with teachers is arranged and when specialized materials are provided.

Research Reports

In educational literature many reports concerning the merits and demerits of the special class for gifted children can be found; conversely, quantitative research data that fulfill the criteria selected for this review are relatively scarce. An attempt was made to choose data-based studies of programs that involved ability grouping at the elementary school level and that employed objective and comparative measures of school achievement as part of the evaluation criteria.

Early Research

A. G. Breidenstine reported in 1936 on the educational achievements of pupils in differentiated and undifferentiated groups.[1] He summarized previous research, including several studies that pertain to the present investigation, because they referred to children in elementary grades. Briefly, these pertinent studies and their conclusions are the following:

Barthelmess-Boyer. H. M. Barthelmess and P. A. Boyer conducted an experiment in the Philadelphia elementary schools to determine the value of ability grouping as it pertains to educational achievement. When they compared the basic skills of pupils in ability groups with those in regular classes, they found statistically significant differences in favor of the homogeneously grouped pupils in the improvement of reading, arithmetic, and technical English skills. Improvement was found to exist in each of the several groups studied: the high, the low, and the medium.[2]

Dvorak-Rae. August Dvorak and J. J. Rae reported in 1929 on an experiment with bright first-grade children. They used three tests: the Pintner-Cunningham Primary Mental Test, the Holley Picture Completion Test for Primary Grades, and the Detroit First-Grade Intelligence Test. On the basis of these tests, some of the high-ability children were placed into a special class and equivalent groups placed into regular classes. Statistically significant achievement gains were made by the segregated superior group over the ungrouped superior learners in both oral and silent reading when tested by the Gray Oral Reading tests and the Pressey First Grade Attainment Scale in Reading, followed by Pressey's Second Grade test when the ceiling of the First Grade test was found to be inadequate. Differences beyond those of chance were not found in spelling achievement. The observations of the investigators were that: (1) when methods and materials of instruction were adapted to abilities, results were positive; (2) mere segregation of bright pupils into homogeneous groups, without adaptation, produced negative or indifferent results; and (3) educators needed to discover techniques and materials for various abilities of pupils in homogeneous groups.[3]

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[1] A. G. Breidenstine, "The Educational Achievement of Pupils in Differentiated and Undifferentiated Groups," Journal of Experimental Education, V (September, 1936), 91-135.

[2] Harriet M. Barthelmess and Philip A. Boyer, "An Evaluation of Ability Grouping," Journal of Educational Research, XXVI (November, 1932), 284-94.

Breidenstine. A. G. Breidenstine's study was of the educational achievement of pupils in grades two to nine in differentiated and undifferentiated groups. He was seeking an answer to the question, "Do pupils grouped according to ability show greater progress in educational achievement than those taught in the traditional way, if the factors of intelligence and grade placement are balanced for both groups?" He made use of the "accomplishment ratio" as a measure designed to discover whether or not the achievement of the pupil is commensurate with his actual intelligence. The "educational quotient" is the educational age divided by actual age, and the accomplishment ratio is found by dividing the educational quotient by the intelligence quotient. Breidenstine concluded that differentiation, as far as his investigation was concerned:

> . . . does not materially benefit pupils in their achievement of high accomplishment ratios. From all available evidence, the pupils of high intelligence do slightly better when in classes where differentiation is not practiced than when in differentiated groups. Those pupils who are only average in ability do as well when segregated as when in mixed classes. The dull pupils in differentiated classes, however, excel in comparison with their mates in undifferentiated classes.[4]

Breidenstine agreed that the result of his study and those preceding his seemed to prove that not differentiation alone but other curricular and instructional measures together with differentiation bring desired results in educational improvement.

Recent Research

Two recent reports throw light on the educational achievement of elementary school pupils in special groupings. One is an evaluation of the effects of program change in one school district of modest size. The other is a comprehensive survey of programs in California, from which a few are selected for mention here.

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[3] August Dvorak and J. J. Rae, "A Comparison of the Achievements of Superior Children in Segregated and Unsegregated First-Grade Classes," Elementary School Journal, XXIX (January, 1929), 380-86.

[4] Breidenstine, op. cit., p. 122.

Savard's study. William G. Savard summarized an empirical evaluation of an experimental program of ability grouping in grades four through eight in the Burlingame (California) School District. The program is called "limited-range grouping" because it limits the range of ability found in any one classroom. The membership of each limited-range class consists of average children, plus a small group of either above-average or below-average children; classes are described as being "upper-range" or "lower-range." This organization was considered as a compromise between the advantages claimed for heterogeneity and the disadvantages inherent in teaching classes with a full range of abilities by removing the extremes in the span of achievement. Groups for the project were established on the criterion of the average reading score yielded by Stanford Achievement tests, plus in some cases intelligence test scores and report card grades.

The purpose of Savard's study was to assess the effects of such grouping on growth in reading and arithmetic as measured by the Stanford Achievement Test. The specific subtests used were Paragraph Meaning, Word Meaning, Arithmetic Computation, and Arithmetic Reasoning. Results of the testing led the author to conclude that limited-range grouping tends to be effective under lower-range situations and of less advantage in upper-range situations.[5]

California State Study. Certain data and conclusions on special class programs that involved middle-grade pupils were selected for evaluation from Ruth Martinson's comprehensive report on the three-year study in California. This study preceded the state legislative program for mentally gifted minors in 1961.[6] Of 17 types of programs she evaluated, three that were classified as "special groupings" and involved pupils in the pre-high school grades are included in the present summary: Saturday class, special class, and part-time interest class. Of the sample of pupils selected, there were 295 in grades five and six, 58 in the control, and 237 in the experimental group.

The portion of the study concerned with special classes for elementary school children involved 32 Saturday class subjects, 31 part-time special interest subjects, and 32 full-time special class subjects in grades five and six. The control group, 58 pupils, was matched for intelligence (on the Stanford-Binet Intelligence Scale), age, and socioeconomic status. The same controls were used for each of the experimental groups. Children whose IQ score was 130 and above were involved in the programs.

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[5] William G. Savard, "An Evaluation of an Ability Grouping Program," California Journal of Educational Research, XI (March, 1960), 56-60.

[6] Educational Programs for Gifted Pupils. (A report to the California Legislature Prepared Pursuant to Section 2 of Chapter 2385, Statutes of 1957, by the California State Department of Education. Roy E. Simpson, Superintendent of Public Instruction; Ruth A. Martinson, Project Coordinator.) Sacramento: California State Department of Education, January, 1961.

Achievement was measured on the Sequential Tests of Educational Progress (STEP), which were administered twice: in May, 1958, and in 1959. On the first test, three-fourths of grade four and five pupils were beyond the average achievement level of grade seven; the upper 50 percent were close to or beyond grade nine level; and the upper quartile group achieved beyond the average for grade ten. After one year in the special class programs, the retesting using the STEP test showed that superior achievement on the part of gifted pupils had been maintained in experimental and control pupils over average pupils. In a comparison between three experimental groups and the gifted controls in regular class assignments, the all-day special class showed superiority over the gifted controls and over the Saturday class. Gains over controls were significant beyond the 1 percent level. The special interest groups showed slight, but not significant, gains over their gifted controls, even though the controls showed gains in excess of the national norming population.

Evaluation of social relationships were based on sociometric studies of friendship choices made before and after participation in special programs. The investigators summarized their findings on grades five and six groups as follows:

> Fifth and sixth grade pupils who attended Saturday classes showed significant gains in social status within their regular classrooms.
>
> The total experimental group of 191 fifth and sixth grade children showed highly significant gains in social status on the basis of responses by their peers in regular classroom situations.
>
> Children in special groups showed no significant changes in social status from regular to special class ratings.
>
> The fifth and sixth grade children in the control group showed no significant change in social status.[7]

Although the purpose of the California State Study did not include a comparison of the relative merits of various arrangements for gifted pupils, the comprehensive reporting of data enabled the summarizing of the findings on three forms of special class programs. Saturday class, special-interest class, and full-time class experimental groups were compared with a common, carefully matched control group. Pretests and post-tests were given at the same time and checked against identical norms. For these reasons, the comparisons that are implied in this summary seem to be justified. The study was exceedingly important for subsequent research in the education of gifted children for the following reasons: (1) subjects were all mentally gifted according to the criterion of a minimum IQ of 130; (2) control subjects of comparable intellectual ability were used to make an objective evaluation of what happened to pupils as a result of a program; (3) programs for the gifted child were designed, supervised, and described; (4) testing instruments with ceilings that could reflect gains adequately were selected; (5) the treatment of data gave controls and experimental subjects equal opportunity to show change; and (6) academic, social, and personality evaluations were included in the design.

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[7] _Ibid._, pp. 147-48.

Summary of the Research

Research studies that pertained to special class groupings for bright or intellectually gifted children in the elementary school grades were selected and reviewed. These studies cited seem to justify the following summary of the findings:

1. Special classes for superior pupils resulted in superior academic gains in those situations where programs were adjusted to the pupils' learning rate and their levels of accomplishment.
2. Ability grouping in the absence of special program provisions appeared not to have influenced academic achievement significantly; findings were mixed and generally inconclusive.
3. Surveys of the parents, the teachers, and the pupils involved in special class programs showed generally favorable attitudes toward the continuation of ability grouping, whether the organization called for part- or full-time participation.
4. Sociometric and other measures of social maturity showed no change of status among peers for most groups of gifted children who participated in special class programs, except for Saturday class pupils who showed significant gains in social status.
5. The California State Study seemed to indicate an upward trend in achievement gains as the grouping plan provided increased amounts of time in the special program. The full-time special class showed greater gains in achievement than any other group.
6. Very few data-based evaluations were available on which to determine the effectiveness of ability grouping on the social or emotional development of academically talented students. No data-based studies were found to support the contention that the self-image of the gifted pupil is enhanced by participation in regular classes or that the academic achievement of average pupils is enhanced by the presence of gifted children in this age-grade group.

Chapter 2

Organization and Administration of Special Classes

The school administrator who is considering various organizational arrangements in planning for the mentally gifted children under his administration might well review recent research studies of grouping as his first step. Consideration of the advantages of special classes and an evaluation of the problems that cause many programs to be discontinued are also advisable. Such an evaluation should be carried out in the context of the educational needs of the particular gifted pupils under the administrator's jurisdiction. These needs may be assessed by direct classroom observation of each pupil's reactions to the school experiences in major content areas presently being offered him. Some of the questions which might constitute this informal appraisal are: Was the pupil an interested participant, attending when not speaking? Did his cognitive tasks include conceptual learning, hypothesizing, and problem solving? Was he interpreting, analyzing, and evaluating knowledge in addition to accumulating it? Were his study materials selected to approach a level comparable to his reading comprehension level? What were his opportunities for creative production? Did he finish his assigned work? What did he do if he had time remaining?

The special class programs for gifted pupils at Davis and Lompoc were selected and conducted as demonstration centers for California Project Talent. The organization of these programs discussed in this chapter offers the questing administrator insight into possible organizational arrangements. General guidelines for the administrator who seeks to inaugurate a successful special class program for gifted children are suggested. They are based upon the experiences of personnel involved in California Project Talent. They include nine recommendations: (1) recognize individual differences; (2) stress talent development; (3) avoid complete segregation; (4) select secure teachers; (5) pretest the pupils; (6) be informed; (7) individualize the instruction; (8) provide suitable materials; and (9) keep the program inconspicuous.

The prototype program which might be considered a "summary" of special class programs is also briefly discussed. This suggested organization could be adapted for districts of only one school or of many schools.

Advantages and Disadvantages of Special Classes

The academic opportunities which accrued to mentally gifted children assigned to special classes were well documented in the California State

Study of 1961-62.[1] Some researchers have reported nominal or inconsistent results when ability grouping was undertaken without specific attention to program development. Classroom arrangements which may be close to ideal for one learner may teach another child of the same age that school is a very dull place and that most of his peers are stupid. The gifted child should have the opportunity to learn that talent is a "many splendored thing" and that almost everyone has some interesting, worthy, and productive qualities, even though these qualities may be different from his own. Whether the regular class offers the best setting for all pupils to learn modern mathematics and to come to understand the world of the other person is a question each elementary school principal must ask himself as he considers the needs of his atypical children or the needs of those with atypical qualities. The relative advantages over the disadvantages of the typical grade level grouping is challenged by some administrators when they establish ungraded classes organized on some criteria other than age grouping.

Questions in Grouping

The question becomes, What kind of grouping should be initiated for gifted children, and for whom? The pertinent questions concerning the establishment of special classes for the gifted include the following:

- Who? The high achievers? The musically talented? The intellectually gifted? The highly gifted (pupils of IQ 150 or over)?
- When? Grade two? Six? Secondary school? College?
- What? Accelerated content? Instruction by artists? Research with a scientist? Curriculum designed in depth?

Decisions about grouping must be based on educational needs, broadly conceived, of the individual pupil; schools must be organized for the children they serve.

Advantages of Grouping to Pupils in Special Classes

The advantages of grouping to gifted pupils in the special class appear to increase as the individual child's ability increases beyond the mean of the class, according to the findings of research consultants for California Project Talent. Their observations of special classes took place over a three-year period, during the summer and during the school year, both in the demonstration centers and in the school districts outside the project. The advantages that relate to the gifted child's academic potential and the factors influencing his learning in school include the following:

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[1] Educational Programs for Gifted Pupils. (A report to the California Legislature Prepared Pursuant to Section 2 of Chapter 2385, Statutes of 1957, by the California State Department of Education. Roy E. Simpson, Superintendent of Public Instruction; Ruth A. Martinson, Project Coordinator.) Sacramento: California State Department of Education, January, 1961.

1. Special class grouping permits the pupils to explore content in greater depth. Change in the curricular framework is not needed in most areas, but the opportunity to study in depth is critical, whether the content is physical science, social science, or biological science.
2. Intellectually talented pupils stimulate each other to expand their interests, to explore abstractions, to speculate on consequences, and to hypothesize about phenomena. Gifted children, as a group, tend to be tolerant of the offbeat suggestion, the symbolic poem, or the atypical classmate, and therefore tend to reinforce creative production.
3. Superior pupils may be taught systematically and efficiently the study habits and study skills that are necessary for understanding resource materials which they prefer to read. In the regular class, the gifted are on their own resources most of the time because the groups that work at their level are too small in membership to command blocks of the teacher's time adequate for a planned sequence of instruction.
4. Less time is needed in a special class than in regular classes to acquire the skills, information, and concepts that are standard at a given grade level. The time saved can be devoted to activities such as puppetry, music composition, imaginative writing, scientific exploration, and advanced mathematics.

High Mortality of Special Programs

Creative school administration calls for anticipation of the inherent problems in any system of organization and the strategy to avoid predictable difficulties. Despite the reported success of special classes for gifted children of elementary school level, many districts have conducted a program for a time and then discontinued it. An informal followup of some of these situations suggests a number of factors that contibuted to the mortality of the special class.

Change of personnel. Many times the principal or teacher who activated the program is promoted or transferred, and the program fails because the void is not filled by a person who is equally interested or skilled.

Lack of curricular adjustment. Occasionally changes are made in the organization of a school without comparable attention being given to changes in program and materials. Grouping children without special curriculum development is a waste of the initial effort.

Lack of evaluation. Often a special class program is not evaluated objectively, so that no one knows with certainty whether the gains for the pupil outweigh the special attention that is needed to keep the program functioning. Subjective evaluation is prone to reflect the prejudgments of the personnel involved.

Need for unique materials. Materials needed for special classes replace the usual books and equipment and thus are not additions to more routine supplies. Teachers of higher grade levels may be reluctant to have used at lower levels materials which they regard as designed or written for their own age-grade groups.

Lower grades for superior pupils. Often parents express fear that the lower grading in special classes, where gifted children compete with their equals, will handicap their child when he reaches secondary school or applies for college entrance. Many parents oppose a special class assignment for this reason alone.

Affective factors. The attitudes of some adults toward gifted children must be recognized as a hazard to many special programs, particularly the special class. Expressions that are negative in nature take many forms, including, "If you want to help pupils, why not the ones who need help? The gifted can take care of themselves."

None of the hazards listed is insurmountable, however, if the planning, administrative finesse, and attention given to this program are comparable to those given to other programs for exceptional children.

Administrative Structure in the Demonstration Centers

The programs in the two special-class demonstration centers were in operation prior to the beginning of California Project Talent and continued to function at the time of this report. Both programs were full-time special class arrangements for intellectually gifted pupils. Aside from these criteria, the organization of the special class in each case developed in accordance with the unique needs of the district. The centers were located in the Davis Joint Unified School District, a relatively stable and compact district in a small university community, and in the Lompoc Unified School District, a fast-growing, extensive area that surrounds and includes Vandenberg Air Force Base.

High Achievement Potential Group in Davis

In the Davis center gifted pupils in grades five and six, selected from the entire district, comprised a combination class in the North Davis Elementary School. Some of the pupils were transported, but the transporting did not pose a problem because of the compactness of the district. This culturally advantaged community has a high proportion of intellectually talented children. W. R. Whitzel, principal of the school in which the program was held, supervised the program. The children participated in the middle-grade activities of the school, and their teacher participated in regular staff responsibilities. The class size was limited to about 20 pupils, and critera for selection, in addition to a minimum IQ of 130, were developed along lines explained fully in Chapter 3.

Honors Program in Lompoc

Irwin Wapner, Director of Pupil Personnel Services in Lompoc, prepared a description of the honors program in Lompoc; his explanation of the organization of the classes is summarized here:

> The Lompoc Valley lies in a semi-isolated region approximately ten miles east of the mouth of the Santa Ynez River in Santa Barbara County. ... The population of Lompoc remained relatively small from its founding in 1875 until the opening of Vandenberg Air Force Base in 1958. This new industry brought with it an immediate population explosion; the community grew from 5,000 to over 21,000 within the four-year period 1958--1962. This growth was further multiplied by two outlying communities and the housing on the military base. The schools serving this entire 300-square-mile area consisted of a dozen one- and two-room independently governed schoolhouses feeding into one senior high school in the town. Not until 1960 were these individual units unified into a single school district.
>
> The basic philosophy guiding the entire educational program of this district is a concern with the recognition of and attention to individual differences. This concern focuses attention on individual children and leads to the grouping of children with similar ability and potential. Among the special classes that have been established are "honors classes" for mentally gifted minors. A constant search for new materials, new methods, and better curriculum is carried forth.... As a result of this interest in program improvement and the willingness of this district to accept change, the entire organization is geared for innovation.
>
> The first attempt in developing classroom groups of mentally gifted minors occurred during the school year 1961-62. Two such classes were formed, one in the town of Lompoc and the other at Vandenberg Air Force Base. This was a part-time enrichment program where the children came from their classroom and met with teachers who were subject area specialists. During the spring of 1962 enough children had been identified to create three classes -- two in town and one at Vandenberg Air Force Base -- for the school year 1962-63. During the fall of 1962 these classes were organized in self-contained classrooms taught by very able teachers.... In the spring of 1963 the district was invited to participate in California Project Talent. This gave an additional impetus for program development.... In 1963-64 the classes were placed by area: one group on the east side of town, two groups on the west side of town, and two at the air base -- all in grades four, five, and six....
>
> One of the prime difficulties the area has experienced and is continuing to experience is rapid and frequently unpredictable growth, which makes it difficult to designate a building site and feel confident that one will have classroom space for any given program in the coming school year. It has therefore been necessary to move the program around and place it in buildings where space is available. Since 1963 the project has had nine classrooms with an enrollment of between 235 and 255 children who qualify by the criteria established; these children were drawn from 13 elementary schools. At present these nine classes occupy four classroom building sites....

Approximately 90 percent of the children in the program are transported, which is necessary, since no school building has within its own serving area enough children to constitute a program of classroom size. This has created certain problems. Parents of a handicapped child are less concerned when their child is taken to another school building to attend a program that suits his needs than are parents of a gifted child. With a few exceptions, however, parents are sympathetic and understand the problem of population pressures in certain areas of the city, a problem which has made it necessary to move the program about. In a few cases children have dropped out of the program because of the distances of bus travel.

Guidelines for New Programs

Although the California State Study showed superior results for full-time over part-time programs, relatively few gifted elementary school children have been enrolled in special classes for mentally gifted minors. In talking with parent and professional groups throughout California, the project directors and the research consultants for California Project Talent have found the order of acceptance generally to be first, enrichment; second, special classes; and third, acceleration. This preference is reflected in the proportion of pupils enrolled in enrichment programs. A report made after the school year 1962-63 stated:

> Approximately two-thirds of all elementary school gifted pupils are in programs involving enrichment of the regular curriculum. Acceleration, special counseling or instruction, and tutoring or courses by mail are used infrequently. Little acceleration of gifted pupils occurs during the first six years of school.... Special classes for gifted pupils seem to be gaining ground as the second most commonly used program for elementary school pupils, particularly in grades four, five, and six.[2]

School administrators frequently express an interest in organizing some form of special class; but after exploring the possibilities in the district, they find it easier to implement some other program. The guidelines that follow are suggestions for helping a staff to evaluate what they do for gifted children, to initiate a program that will serve children best, and to undertake a program that will survive. The following practices seem to have increased the acceptance of special classes in some districts.

Recognizing Individual Differences

When a professional staff is able to see the ways in which exceptionally gifted children differ from most other pupils in their knowledge and thinking processes, the staff is ready to recognize the need for particular treatment.

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[2] Paul D. Plowman and Joseph P. Rice, Jr., "Recent Developments in Education for Gifted Pupils in California," California Education, I (January, 1964), 3-4.

An effective way to initiate a study is to use the film Understanding the Gifted.[3] The report, One in a Thousand,[4] is a comparative study of moderately and highly gifted elementary school children, which also exemplifies the necessity of special consideration for some pupils.

Stressing Talent Development

Teachers who have studied the characteristics of gifted children have noticed that their talents lie in diverse fields. The particular manifestation of talent noticed by a teacher often reflects his own hierarchy of values. Thus, teachers are likely to express concern that children have an opportunity to develop beyond the regular curriculum in many areas such as science, mathematics, creative writing, social science, music, and graphic arts. When the staff has reached this stage of involvement, they are almost certain to accept a change that provides time for the creative and productive activities of a special class.

Avoiding Complete Segregation

Plans should be made from the beginning to involve special class pupils in the total life of the school. The children need opportunities to share the unique talents of the professional staff and to interact with their peers. They need to learn to appreciate each person for his particular strengths, whether this be the ability to repair a bicycle tire, to play a musical instrument, or to get elected to the school council. Gifted children also need opportunities to share their own particular talents with others. Some schoolwide activities in which such participation can take place are team games, unorganized play, performances for parent groups, art exhibits, science fairs, school chorus, school band, outdoor education, student council, assemblies, safety patrol, monitor service, and lunchroom hosting.

Selecting Secure Teachers

The special class teacher needs to have personal and professional maturity. The program requires teachers who are intellectually competent, skillful, flexible in classroom organization, and good humored. Teachers should be avoided who are overly critical, who are intellectually snobbish, and who require frequent recognition from colleagues.

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[3] Understanding the Gifted. Churchill Films, 6671 Sunset Blvd., Los Angeles, California, 90028. Available from Audio-Visual and School Library Education, California State Department of Education, 721 Capitol Mall, Sacramento, California, 95814.

[4] Walter R. Barbe, One in a Thousand. Columbus, Ohio: Ohio State Board of Education, 1964.

Utilization of the team approach enables two or three teachers to share the responsibility of the special class and the extensive preparation that this assignment entails. Having more than one teacher helps to assure continuity in the program and extends the contacts between regular and special class faculty. Frequent exchanges of special activities between classrooms increases the communication and helps to avoid cleavages within the staff. Some alternative teaching arrangements are described in Chapter 5, "Education of Teachers of the Gifted."

Pretesting the Pupils

Suitable preparation of curriculum guidelines, materials resources, and evaluation techniques requires that the functioning levels of the pupils be known. Standardized achievement tests that have adequate ceilings can be obtained, are available in more than one form, and include grade placement norms. Testing provides valuable data for the selection of materials and for subsequent evaluations of pupil achievement. Usually a test such as Sequential Tests of Educational Progress (STEP) will meet the criteria, especially if the test is not used as part of the regular school testing program. Problems of evaluation are considered more fully in Chapter 6.

Being Informed

Several bibliographies and research summaries which enable the administrator to update his knowledge of special grouping with a minimal expenditure of time are in print. From these resources he may provide books and journals for professional use by his staff. The following are recommended:

1. John Curtis Gowan and George D. Demos, The Education and Guidance of the Ablest. Springfield, Ill.: Charles C. Thomas, Publisher, 1964, pp. 445-500. The authors, well known for research on gifted students, include in this volume a 55-page bibliography of articles, research reports, and books. Some unpublished material, which is not available generally, is reviewed in appropriate sections of this anthology.

2. Walter R. Barbe, "Homogeneous Grouping for Gifted Children," Educational Leadership, XIII (January, 1956), 274-78. This summary is important because it follows a period of experimental work on ability grouping of elementary school pupils in the United States. Many of the programs designed for the '60s were initiated and abandoned earlier.

3. A. H. Passow, "The Talented Youth Project. A Report on Research Under Way," Educational Research Bulletin, XXXVI (September, 1957), 199-206. One of several pamphlets and articles by this author would be helpful substitutes if this title is unavailable. His summaries are concerned with both program and evaluation.

4. E. E. Holt, A Selected and Annotated Bibliography on the Gifted. Columbus, Ohio: Ohio State Board of Education, 1960, pp. 72-87.

This source is relatively complete to the date of its publication. The section on programs for elementary school pupils annotates 75 reports, including the types of programs and the grade levels wherein they were used.

5. James J. Gallagher and William Rogge, "The Gifted," Review of Educational Research, XXXVI (February, 1966), pp. 37-55. This article reviews the research on gifted students from 1963 to June 1965.
6. James J. Gallagher, Research Summary on Gifted Child Education. Springfield, Ill.: State Superintendent of Public Instruction, 1966. This work brings up to date the foregoing survey of research on gifted pupils.

Individualizing the Instruction

Teachers of special classes usually comment on the interpersonal and intrapersonal differences within the special class. Pupils like to discuss immediate as well as hypothetical questions; they like the frequent opportunities to speak in small groups if permitted. Most of them are self-directing beyond the expectations of age and grade and enjoy individualized materials and a problem-solving approach to content. These characteristics and how they are met by imaginative curricula are discussed in Chapter 4.

Providing Suitable Materials

The school administrator should anticipate the need for four times the amount of materials used by a regular class. Library and community resources should be arranged to cover approximately the type of interests reflected in a college catalogue and should range in reading difficulty from pupil grade level to the level of material written for educated laymen. In planning the curriculum for gifted children of the middle grades, project consultants screened the materials for "suitability in school" but observed that special resources supplied by the teacher were also used profitably by some children in each of the special classes.

Keeping the Program Inconspicuous

Acceptance of the special class will be easier if the administrator manages to operate the program without the use of identifying labels for the teachers, pupils, or the facilities. A group that is set apart, especially with the implication that the group is superior, is likely to become the victim of an unconscious effort on the part of the majority to disprove any superiority. Gifted children are not "better"; their academic needs differ; theirs is the equal right to an education that is commensurate with their potential.

Prototype of the Special Class

The research project consultant has been asked frequently to describe the special class that he or she would recommend or would initiate on the basis of experience if she were to design the program. The district that practices ability grouping at the elementary level and enrolls a hundred or more gifted children might consider the administrative plan described in the Lompoc report. The district that provides many types of programs for gifted pupils, assigning each by individual placement to the program that best fits his development and potential, may want to limit the special classes to the "one in a thousand," or to select pupils with scores three standard deviations above the mean. The prototype program outlined below is relatively easy to initiate, calls for minimal adjustment of regular programs, and is suited to districts of one or many schools.

1. The organization would be ungraded upper elementary, or a combination of grades five and six, plus a few pupils from grade four who need to be accelerated.

2. Pupils whose achievement in reading and mathematics is two standard deviations (2 SD) above the school mean and whose IQ score is 130 ± 5 points would be selected. The standard error (SE) may be used to exclude some children who would not function well in an esoteric program and to include other children whose creative talents or high motivation provide compensating strengths. If necessary to complete the class enrollment and to meet fiscal necessities, the class might be completed with responsible, high-achieving children whose strengths were not reflected in an IQ measure.

3. A team of teachers who enjoy the challenge of gifted children would be recruited to share this special class and regular classes. The teachers would switch groups for any combination of content in which they had unusual competence: reading-language arts, science-social science, and mathematics-music.

4. Inservice programs for teachers would provide released time for staff interaction, visits to programs in other districts, and planning and reviewing new materials.

5. Teachers would be reinforced by the administration in their efforts to raise the levels of pupil thinking through the conscious application of learning models.

6. Materials resources would be adequate to allow teachers to individualize programs according to the range of differences within the special class.

7. Group counseling would be provided to help these pupils who, though healthy emotionally, encounter problems of peer acceptance, self concept, and early anticipation of adult roles.

Chapter 3

Screening and Selection of Children

The type of program offered and the type of child selected for the program are interacting factors, neither of which can be determined without consideration for the other. The selection of children to be enrolled in a special class depends upon the availability of other programs within the district, the number of schools involved, the talents a community values and desires to support, and the prevalence of other competing professional interests among the school administrators and faculty.

Whenever a district offers a strong program of identification and acceleration at the primary grade level and a strong program of enrichment at the middle grade level, the special class is likely to be planned only for very superior children.[1] If the program is planned for children with an IQ of 145 and above, as scored on an individually administered test, a school population of several thousand may be required to supply enough pupils for one special class.[2] One special class may be needed for each 1,000 children if a minimum IQ of 130 is the basis of selection. The incidence of intellectual giftedness in the population is shown in Table III-1. Typically, in communities where programs for gifted children are encouraged and supported, such as Davis and Lompoc, greater numbers of gifted children are found than the proportion of the normal population usually specified as gifted.[3]

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[1] The Gifted Child - How Can The Schools Help? A Report of the Elementary School Subcommittee on Gifted Children, California Committee for the Study of Education. Los Angeles Unified School District, April, 1956 (multilithed).

[2] The usual tests are David Wechsler, Wechsler Intelligence Scale for Children (WISC). New York: Psychological Corporation; and Lewis M. Terman and Maud A. Merrill, Stanford-Binet Intelligence Scale, Form L-M. Boston: Houghton Mifflin Company.

[3] Paul D. Plowman and Joseph P. Rice, Jr., Program Administration: Revised Guidelines for Establishing and Evaluating Programs for Mentally Gifted Minors. California Project Talent. Sacramento: California State Department of Education, June, 1964 (multilithed).

TABLE III-1

Approximate Incidence of Intellectual Giftedness
by Stanford-Binet IQ Standards

Standard deviation above mean	IQ* minimum	Designation	Percent of population	Number of gifted per 10,000 pupils
1	115-116	Able	15.87	1,587
2	130-132	Talented	2.23	223
3	145-148	Gifted	0.135	14
4	160-164	Highly gifted	0.003	0.3

*Standard deviation of the Stanford-Binet, Form L-M = 16.

Criteria for State Programs for Mentally Gifted Minors

In California, school districts providing advanced or enriched work for mentally gifted minors may claim reimbursement from the state for the excess costs of such programs if they meet certain criteria. The classes may be conducted during the regular school year or during the summer session. During the 1965-66 school year the reimbursement was limited to $20 per pupil for the summer and $40 per pupil during the fiscal year. In many districts budgetary considerations have limited the enrollment in the special classes to children who meet the following standards for the reimbursed programs for mentally gifted minors (MGM): (1) the child must be identified as gifted. In most cases identification requires an IQ of 130 or above based on an individual test, such as the Stanford-Binet; (2) consent of the child's parent(s) or guardian must be obtained for the child to participate; (3) individual case study records must be maintained; and (4) goals, student activities, and plans for evaluation of proposed programs must be written and made available for public inspection.[4]

Summer programs in the demonstration centers have taken some of the many forms of approved programs. They include special classes in humanities combined with counseling for junior high school students; special summer sessions in lieu of grade three for children in the acceleration program; or enrichment classes in science, mathematics, creative writing, or social science for gifted pupils of the middle grades. Sometimes the summer program is the only provision a district is able to make for elementary school children with specialized and creative talents.

Excess-cost reimbursement is also allowed for expenses which: (1) are incurred to provide the special program; and (2) are identifiable as MGM program items in the budget. Expenses that may be so classified include identification of pupils, counseling parents and pupils, special consultants, instructional services and materials, and inservice education of teachers. When the instruction of the special class is given by the regular classroom teacher, the current expenses that accrue from identification and counseling may be recovered from the state.

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[4] Education Code, Division 6, Chapter 6, Article 14; and California Administrative Code, Title 5, Education, Sections 199.11 through 199.21.

Manifestations of Talent

Pupils identified for the special class on the basis of IQ only will show great variability on all the characteristics related to but not identical with intellectual giftedness: creativity, artistic talent, motivation, mathematical aptitude, verbal facility, accuracy of articulation, spelling skill, social poise, gregariousness, and leadership. A perceptive project teacher pointed out that her pupils were individuals and not types and that the characteristics of gifted children cannot be assumed about any particular child. The gifted are not all highly motivated, are not all good readers, and are not all tall and healthy.

Giftedness is manifested in many ways. Some of the variations in special ability which may require special nurture on the part of the school include at least five general categories: the social-empathic, the artistic-creative, the kinesthetic-mechanical, the symbolic-structural, and the verbal-receptive pupils.

Social-Empathic

Individuals whose greatest gifts are in the realm of interpersonal relationships show sensitivity to the moods, feelings, and aspiration of others. From this group come eminent political figures, outstanding salesmen of products or ideas, and great teachers. Special classes need to be involved with student government and other activities that permit the early development of leadership.

Artistic-Creative

Productive artists develop the ability to interpret their perceptions of the physical and social worlds. Their medium of expression -- whether words, paint, sound, or steel -- is selected because of experiences that were reinforced. The Pasadena schools have offered special classes in music, literature, and art for elementary school pupils. Opportunities for original, aesthetic production should be part of the school experience for all children so that those with unusual talent can be screened for further specialized opportunities.

Kinesthetic-Mechanical

Famous athletes, ballet dancers, and some inventors have developed their body control mechanisms to outstanding levels. They respond at very high levels of sophistication to proprioceptive stimuli. Gifts that are not academic frequently are not valued in schools oriented to middle-class values. One intellectually-gifted girl created consternation in her community when she decided to become a dancer and said that if she did not make the grade, she would then enroll in college.

Symbolic-Structural

Mathematical and scientific abilities are built upon the symbolic-structural constellation of intellectual talents. The special classes in Lompoc were taught methematical logic in addition to modern mathematics. Individual projects were organized to develop and to exploit interest in science. Some pupils, particularly girls, who previously had shown no special ability in symbolic-structural areas were observed to have increased their competence markedly. This kind of potential has always been academically respectable and has become more so in the climate of cold war technology.

Verbal-Receptive

Most teachers tend to nominate for the gifted programs the child with the verbal-receptive type of ability. These are the children who become scholars, reading fantastic quantities of material which they classify and remember for subsequent retrieval. Many intelligence tests, including the Stanford-Binet, are weighted in favor of verbal facility over other intellectual strengths. Children selected for special classes because of this type of superiority can likely be encouraged to develop other forms of talent.

Screening and Nomination

After decisions have been made regarding the intellectual level from which the special class group will be selected and the kinds of talent development which the program will undertake, the screening and nomination procedure must be determined. Screening is based, usually, on group tests. If the screening is done at primary level, with consideration for possible assignment to a grade four special class, any of the group intelligence tests listed for the acceleration program may be used: California Test of Mental Maturity, Form 1; Kuhlmann-Anderson Intelligence Tests, 7th Edition, B; Lorge-Thorndike Intelligence Tests, Primary 2; Pintner-Cunningham Primary Test; and Primary Mental Abilities Tests - Grades 2-4.

If the intention is to include all children who qualify for special programs under legislation for mentally gifted minors in California, probably all who rank more than one standard deviation above the mean on the group intelligence test should be considered. Frequently, however, the district is unable to manage the cost of testing six or eight children individually to find one gifted child. Only the cost of identifying the one child will be reimbursed. Most districts find additional screening or nomination criteria necessary to cut down the number of individual tests administered, even though they know that some gifted children will be overlooked in the process. A compromise procedure, which considers both economic and curricular factors, is recommended for adaptation in local districts:

1. A group intelligence test should be given. Primary level tests tend to show nonverbal strengths as well as verbal competence.
2. Pupils who rank 2 SDs above the mean, or attain an IQ of 130 ± 5 on a group test should be referred for individual tests, without further screening.
3. Pupils who rank between one and two SDs above the mean and have an IQ of approximately 115-129, should be reviewed on the basis of achievement test scores. Pupils whose reading and arithmetic scores are at or above the 90th percentile should be referred for individual tests.
4. Children who obtain 130 ± 5 on the Stanford-Binet or 130 ± 4.5 on the WISC scale should be reviewed by the nomination committee.

Pegnato and Birch checked the relative effectiveness of four different measures for identifying gifted children. They found the order of decreasing efficiency in identification to be: (1) group intelligence tests; (2) group achievement tests; (3) teachers' judgment; and (4) school grades.[5] The screening procedure outlined in the preceding paragraph may be expected to uncover some surprising candidates for the special class.

The committee that reviews and nominates pupils for the special class should consist of an administrator, a personnel or guidance specialist, and a teacher who knows the classroom functioning of the child under consideration. The function of the committee is to examine and interpret the cumulative folder or case study. Handicaps not reflected in intelligence or achievement tests should offer no greater difficulty for the child in the special class than in the regular class. However, some characteristics in children may prevent their functioning at the levels anticipated for the program. These characteristics could include difficulty in reading, extreme distractability, emotional problems, or lack of English proficiency. The committee can perform a valuable function by referring pupils they reject for the special class to appropriate special services or agencies. An additional test may have to be given some pupils before placement is finally recommended. Some minority children, or the culturally deprived, show their abilities more accurately on the Performance Scale of the WISC. Special categories, such as leadership and creative talent, must be evaluated individually, especially for the 125 to 130 IQ group.

After candidates are selected for the special class, their parents must be notified, preferably in an interview, and written permission for their child to enter the program should be obtained.

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[5] James J. Gallagher, Teaching the Gifted Child. Boston: Allyn and Bacon, Inc., 1964, p. 9.

Selection in the Demonstration Centers

Procedures that serve well generally for the selection of special class pupils are often modified in a particular school district. The demonstration centers for California Project Talent were examples of different programs that required different selection procedures. Unlike most districts in California, the Davis Joint Unified School District used the WISC as the major selection instrument. Rationale for its use was interesting and informative and is summarized from a taped interview with Mrs. Hannah Bower, Davis School District psychologist, who was in charge of individual testing of gifted class candidates.

Davis: Use of the WISC Test

The Davis school population contains a high number of very verbal children from culturally rich homes, particularly the children of faculty members and graduate students of the University of California at Davis. It was found in this district, which has a median at the 73rd percentile in group intelligence and achievement scores, that the highly verbally skilled child was not necessarily the gifted child. After receiving the results of the district testing and weighing the implications of the WISC and the Stanford Binet tests, it was decided that to distinguish adequately the very atypical Davis child, high scores in both the performance and the verbal areas of the WISC would serve the purpose better. This would not necessarily be true in less privileged districts, according to Mrs. Bower; but she has found that a more well-rounded, overall giftedness is necessary to achieve a high score on the WISC test.

Mrs. Bower also reported that certain subtests of the WISC offered special insight into significant kinds of behavior. Gifted pupils tend to improve their performance on the block design test as the task becomes more complex. They seem to learn as they work. Also on coding items, if a child has no motor difficulty, he gains an immediate experience from the learning task. This differentiates, in the psychologist's opinion, the "learning gifted" child from the "just able" child, who still learns pretty much the way average children do; that is, through a lot of reinforcement and training.

In answer to the question as to whether creative children were being identified by the present screening procedures, Mrs. Bower expressed some doubts. By using a figure drawing, the WISC, and a brief interview, the examiners were able to assess creativity in a number of children. However, other ways of identifying creative abilities can be found, once a program for creative children is set up and time and money are expended for these children. The program as it was set up in Davis was designed for the grade five or six pupil who is achieving very high academically, who is intellectually talented, and who needs the extra enrichment at this particular point in time.

The psychologist sees the pupils in the Davis program as those who have developed mentally earlier than many of their peers. She feels that in emotional and self-direction characteristics these pupils are also two or three years advanced. She has found that one advantage which can accrue from participation in a special class is the personal growth in self-understanding that these children are able to develop by being with their true peers.

The WISC test, which the Davis demonstration center considers best for its particular situation, has not always been used exclusively at Davis. During a period when the class was on a part-time basis, the Binet and WISC tests and teacher ratings were used. The teacher rating was later discarded when it was found that about 20 percent of pupils the teacher rated very high were over-conforming and high-achieving rather than gifted.

Lompoc: Use of the Stanford-Binet Intelligence Test

The Lompoc Unified School District used standardized test scores primarily for screening and the Stanford-Binet for most individual testing. Their selection procedures were described by Irwin Wapner, Director of Pupil Personnel Services, Lompoc Unified School District:

> The initial step in establishing a selection process was to review all previous test records of pupils in grades four, five, and six and solicit recommendations from the teaching staff. From this pool of pupils we hoped to identify a large enough group to establish six or more classes....
>
> The criteria for entrance into the honors [program] were adopted from the state code. The original legislation (changed July, 1965) permitted entry into the program if a youngster scored at or above the 98th percentile on a group intelligence test and at or above the 98th percentile on a standardized reading test or arithmetic achievement test. Our classes in 1962-63 and 1963-64 school years contained some youngsters selected using these criteria. Our teachers indicated that there is a noticeable difference between these children and those selected with an individually administered intelligence test.
>
> In addition to test performance the code specifies two additional procedures for admission -- individual case study and consent of a parent, guardian, or other person having actual custody.
>
> The legislation permits placement of other youngsters who do not meet all the stipulated criteria, if the committee approves. They may not exceed 3 percent of the enrollment of the program. We seldom have more than 2 percent of this group in the program.

The rapid expansion within the district and the turnover in enrollment which occurs in schools that serve military personnel resulted in the entrance of children who had not taken the screening tests and some whose records were meager. Teacher referral and individual testing enabled many qualified pupils who were relatively new to the district to enroll in the special classes. Although research studies generally have failed to identify most gifted children on the basis of teacher judgment, one teacher referred four children in as many weeks for individual testing and three qualified for the MGM program. When the research consultant asked her what characteristics she looked for, the answer revealed the cause of her success: "I look for the ones who come up first with the generalization in science or social science, who use a high-level speaking vocabulary, and who learn the new processes the fastest in mathematics."

Gifted children are found in all economic, social, and ethnic groups. Children from families with low cultural aspiration tend to merge downward into the general student body, and their unique native endowment tends to fall short of optimal development. To retain a position at the upper reaches of the continuum, a pupil needs both superior endowment and a superior learning environment at home as well as at school.

Chapter 4

Curriculum Development

Content, materials, and methods are the core of the educational demonstration project. Two prototype programs in California Project Talent -- the special class and the enrichment program -- were conducted for gifted children of grades four, five, and six. The pupils in both programs were of comparable intelligence ranges and chronological age spans. Therefore, in both programs curriculum development, which is oriented to the learners, may be expected to show similarities of purpose, level of instruction, suggested materials, and evaluation procedures. Because of freedom to expand beyond the scope and sequence of the standard curriculum framework, some teachers of special classes organized much of the subject matter content within the broad areas of emphasis, such as language arts or humanities. Examples of creative organization of content on the part of teachers and of creative production on the part of pupils are included in this chapter.

Enrichment curricula for gifted children were taught within cluster groups in the Los Angeles Unified School District demonstration center. The materials and techniques devised to develop creative expression, scientific discovery, and critical appreciation in pupils have specific relevance for the special classes, also. The reader who is concerned with curriculum development in the middle grades should also review the other California Project Talent reports.

Rationale for Special Instruction

The purpose of the special class is to provide learning opportunities that are uniquely suited to the gifted child. The special class organization enables the teacher to gear instruction to a much higher level, generally, than is possible in a so-called heterogeneous group; but any assumption that the special classes were homogeneous is incorrect, as qualified observers were quick to note in their visits to the demonstration centers. As for any other class, curriculum planning should be based on variability of pupil potential and accomplishment and should provide flexibility in class organization as well as motivation of gifted children to utilize school resources fully.

Variability of Pupils

Because of the selection criteria for the special classes in the project demonstration centers, the measured intelligence of the pupils ranged from the minimal IQ of 130 to some unknown point beyond the top of the scale, approximately 160. Nearly always, when groups of gifted children are selected from a sizeable school population, some pupils are included whose abilities go beyond the ceiling and whose intellectual qualities are not fully sampled by the tests in use. The theoretical variability that one might expect on the basis of the normal probability curve tends also to occur in the special class; that is, subjects are clustered in high frequency near 130 IQ, and decreasing numbers of subjects are found at each interval toward the extreme upper limits of the curve.

The specialized attention that has been given to the education of pupils at the low end of the intelligence continuum has resulted in the organization of three kinds of programs for three low ability groups: the educable mentally retarded, who receive a school program adapted to their slower learning rates; the trainable mentally retarded, who are taught self-care and social skills; and the severely retarded who are given institutional care. The range of ability at the high end of the continuum is comparable, theoretically, but little recognition has been given to this range of differences in groups of gifted children.

Variability within individuals also should be used as a basis for curriculum planning. The typical gifted child shows a difference of approximately two to six years between his lowest and his highest mental age scores in such intellectual areas measured by the Stanford-Binet Intelligence Scale as Verbal Absurdities, Vocabulary, Digit Span, and Memory for Designs; while many gifted children show more than six years' variation.[1] Differences of three or more scaled scores are usually found between high and low subtest scores of any one pupil on the Wechsler Intelligence Scale for Children in such significant abilities as Information and Comprehension, Block Design and Picture Completion, or Arithmetic and Digit Span.[2] These statistical differences, which are typical rather than exceptional, are so great as to represent real differences in ability from one manifestation of intelligence to another.

One special class in the summer acceleration program was observed, rated, and described on the basis of classroom functioning of individuals. Although most children were academically oriented, the children in the group were found quite diverse in cognitive styles, physical development, self-image, expressiveness, and creativity.

The curriculum planner must assume that: (1) special class children will differ extensively in their rates of learning and their mental ages at any given time; and (2) individual children will show different levels of potential for different kinds of school tasks. The intrapersonal and interpersonal differences within the special class require an individualized and flexible program.

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[1] Lewis M. Terman and Maud A. Merrill, Stanford-Binet Intelligence Scale, Form L-M. Boston: Houghton Mifflin Company, 1960.

[2] David Wechsler, Wechsler Intelligence Scale for Children. New York: Macmillan Company, 1964.

Flexibility of Organization

Some of the characteristics that are common to most gifted children have implication for the way the teacher organizes the classroom. To a large extent the irritants which some gifted children inject into the regular classroom are eliminated by an environment that is more conducive to learning. This is especially true with an activity they pursue with great effectiveness and enthusiasm. Following are some of the characteristics observed in most special class children and some of the implied arrangements by which the teacher can utilize and develop these characteristics:

Tendency to be competitive. Self-evaluation opportunities which put the child in competition with himself should be arranged; competition between individuals should be minimized. Intellectual approaches to aesthetic appreciation, self-understanding, and social interaction are needed.

Ability to manipulate abstract symbols. Manipulation may be needed but in lesser proportions than for other children; hypotheses and formulae building are fun for gifted children.

Ability to concentrate. Individual and small group activities may proceed simultaneously if standards are developed that avoid disruption. Tasks, projects, or contracts that cover many school days are appropriate.

Desire for high achievement. Individualized materials which permit a pupil to work at his own pace in areas where he is interested or is weak are needed. These might include laboratories for skill development, kits for study or experimentation, and programmed and self-instruction materials.

Tendency to be adaptable. Changes in routine can be made to accommodate resource people, to go on study trips, to attend special events, or to fit a team teaching schedule. Weekly schedules, to replace daily schedules, are feasible. Adjustments to several teachers and to new situations are usually made easily.

Sensitivity to physical environment. Attractive rooms are important. Bulletin boards instruct; contrived displays launch new topics of study; and exhibits motivate creative production, both before and after they are shown.

Sophistication in social behavior. Group responsibility can be developed to replace control by the teacher during many portions of the school day. With adult guidance, the gifted can choose room officers who take care of most routine matters. Leadership develops quickly, but guidance is needed to help pupils learn democratic processes in resolving conflicts. Individual responsibility can be developed early in nearly all pupils.

Unusual perceptiveness. Activities that presuppose insights and awareness not usually found in elementary school children may be planned. Original work in science, poetry, mathematics, music, and other areas may be anticipated as experiences that will be rewarding, satisfying, and reinforcing.

Tendency to be easily motivated. Small group or individual work may be organized by the teacher, then conducted partially by the pupils themselves.

The most productive project classes were able to move easily from whole group to small group to individualized instructional settings according to a subject matter schedule or the unexpected needs of the moment. Gifted children were more willing than most others to ask for help when it was needed, whether the problems were interpersonal or material. One teacher organized an activity period which was scheduled for two class periods each week.[3] Pupils could choose an activity from a list prepared during group discussion and conducted by individuals or small groups, usually for more than one class period. The choices available at one point in the program were posted as follows:

Activity Period Chart

Science

1. Learn to use the microscope and prepare slides.
2. Study the celestial globe, star chart.
3. Work with the spectroscope kit.
4. Work with individual science kits.
5. Do experiments.
6. Do research.

Math

1. Learn to use the slide rule.
2. Study topology.
3. Solve math puzzles; create your own.
4. Work with different number bases; create your own symbols and system.
5. Study geometry.
6. Explore the field of logic.
7. Study history of the number system.
8. Learn to use the metric system.

Music

1. Listen to records and tapes; view filmstrips; read about composers.
2. Create a song.
3. Develop a dance to music.

Writing

1. Write a story or an essay
2. Write a play.
3. Write a myth, legend, or folk tale.

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[3] Eleanor Olson, special class teacher at North Davis Elementary School.

Dramatics

1. Write a play.
2. Make puppets; put on a puppet show.
3. Act out a scene in pantomime.
4. Dramatize a scene from your favorite book.

Art

1. Study artists and their work.
2. Paint.
3. Do stitchery.
4. Draw with chalk.
5. Do soap carving.
6. Work with mosaics.
7. Build mobiles.

These are the kinds of activities the children in the special classes like to undertake. The pupil's own need at the time determines whether he will seek novelty, verification, or interaction. Self-evaluation by pupils and guidance from the teacher together build the standards for whatever is pursued or produced. These and other matters concerning the gifted were discussed at a special conference in November, 1966.[4]

Motivation of Gifted Pupils

Academically talented children, like other pupils, are more likely to record the stimuli they are attentive to than that which is merely present in the learning environment. As learners they are likely to retrieve information that satisfies some need more compelling than the necessity to complete an assignment. Perhaps this could be the need to resolve conflicting data, to fit the last piece into the puzzle, to solve the mathematics problem, to record a feeling on a paper, or to try for an effect in a sonata. What the child needs to learn is a highly personal matter; therefore, the superior teacher is concerned with as many motivational factors as there are children in the class.

John A. R. Wilson, Mildred C. Robeck, and William B. Michael have proposed a model that shows the interaction between the cognitive and motivational spheres of learners. They suggest that level-one learning involves the building of associations between bits of knowledge that are the facts, details, and particulars of much school content. Level-two learning occurs when the pupil conceptualizes the relationships within a body of material such as the "discovery" of Bruner, the insight or the "ah ha" moment of the gestaltists, or the more recent psychological concept of "closure." Associations of pleasure are linked with attending, responding, or valuing behavior whenever the pleasure is reinforced -- level-one reaction in the motivation sphere. Level-two motivation occurs when the learner grasps the causal relationships of his reinforced activity and his satisfaction. Creative self-direction, level three, seems to result from the fusion of the motivation and the development of a cognitive structure -- a fusion that frees the individual to operate in unique ways and to pursue his own productive ends. In creative activity the pupil functions for his own purposes, and in the process he learns. He proceeds beyond established structures because he wants or needs to do so.

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[4] California Project Talent. Compiled by Paul D. Plowman and Joseph P. Rice. Sacramento: California State Department of Education, 1967.

This learning-motivation model suggests a technique to teachers who are anxious to encourage the intellectually brilliant pupil to become creative, self-motivated, and self-directing. In this technique the pupil who is beginning to explore a new field of knowledge is helped to acquire quickly the basic bits of information that lead to the discovery or conceptualization of the relationships inherent in that knowledge. At the same time, the teacher reinforces the pupil's progress, helping the child link the association of pleasure with the exploration in progress. As awareness of the pleasure develops, a conceptualization is encouraged of the relationship between the feeling of pleasure and success in learning. The final step involves encouragement for the pupil in the emergence of his self-concept as one who is willing and able to perform in this field as a creative, self-directing individual.

The learning-motivation model is valuable in structuring the remediation of the intellectually superior child who lacks motivation for schoolwork. The fundamental problem for the teacher is to locate the areas of interest or the areas of least resistance. To teach a pupil to generate pleasure in the kinds of learning that he formerly resisted is a slow process. With careful structuring of the learning sequences to assure success and with powerful reinforcement at each evidence of achievement, the negative conditioning which occurred during his earlier learning experiences can be counteracted.

Subjects and Skills

The individuality of the learners in the special classes dictated curricula that were diverse in content, level of difficulty, appeal, and standards for achievement. The pupils differed in what constituted a challenge, in the quality of their production, in experience, in learning rate, in originality, in social competence, in attitudes toward scholarship, and in achievement levels. Observation and experience in the demonstration center classes dictated the following descriptions of curricula which include the materials and procedures that were found most suitable for gifted children over a period of time. Most of the suggestions and examples are drawn from special classes of grades four through six; however, some of the material contributed by teachers of grade three and grade seven summer classes was included because of its pertinence and significance.

Reading

In the demonstration centers, the achievement reading levels of children beginning grade four ranged from below grade level to the level of well-read adults; grade six teachers reported minimal grade level achievement of grade seven and maximal achievement beyond the limits of their material for half of the class. The challenge for the teaching staff was to find sufficient material that was suited to children's interests but written at a level that would stimulate their need for refinement of reading skills. The rare cases of reading disability in the special class were assigned to teachers who knew how to diagnose the problems. One boy with grade one sight vocabulary and no notion of sound-letter association was tutored after school almost daily by his classroom teacher and in a few months was reading above grade level. Some of the procedures used in reading instruction are discussed below.

Whole class instruction. Most teachers worked with the whole class while launching a program, such as the Science Research Associates (SRA) reading laboratory; when teaching a new skill, such as use of the school library; while initiating a special form of literature, such as drama; when evaluating procedures and progress; and when teaching reading related to other activities, such as creative writing or art. In each of the classes, one district required the use of a basic book which the teachers used at the beginning of the year to check each pupil for any specific weaknesses and to select a subgroup of pupils for a sequence of directed work in grade level reading skills. During whole class instruction, the teachers observed pupil functioning in reading and organized subgroups for individualized work or small group instruction.

Flexible subgroups. Small groups were formed as needed for directed teaching of a particular skill and for discussion of selections from literature. Junior Great Books were used with certain additional adaptations for pupils at one grade below recommended levels. Some teachers reformulated the discussion questions to include the intellectual process dimensions of Guilford's construct: cognition, memory, divergent production, convergent production, and evaluation. Another departure from recommended procedure was the use of pupil discussion leaders for the several groups who met simultaneously.

Selections from junior high school level anthologies -- other than the books used in the standard curriculum -- were read by small groups, primarily on an interest choice basis. Two series were tried successfully: American Adventures (Harcourt, Brace & World, Inc.), including such works as A. Conan Doyle's "The White Company," Van Druten's "I Remember Mama," William Saroyan's "The Human Comedy"; and America Reads (Scott, Foresman & Co.), containing sections in each book on short story, biography, poetry, drama, and novel. Some other titles which met the criteria for literary materials were Olivia Coolidge's Greek Myths (Houghton Mifflin Co.), Riverside Literature Series; David Aloian's Poems and Poets (McGraw-Hill Book Company); and Miriam Cox and Kinco Fuglii's The Three Treasures: Myths of Old Japan (Harper and Row Pubs.). Some paperback titles were purchased in quantities of ten or fifteen for group study, such as Kipling's Captains Courageous of the Classics Series (Airmont Books). A poetry anthology that appealed to both boys and girls was Untermeyer's Story Poems (Washington Square Press).

which contains nearly 200 dramatic poems relating to English and American history. Regular grade level adoptions were found useful in some classes for certain pupils, usually for a limited period of time. Specific curriculum planning was needed to make suitable materials available to the gifted pupils without usurping titles that were part of the core studies in junior high school English classes.

When gifted pupils in the special class have reached grade six, they are ready to learn advanced reading skills such as adaptation of reading rate to the material and the reader's purpose, vocabulary development in specialized areas, understanding generative roots of words, and high level comprehension. As critical readers, gifted children should learn to do as Edgar Dale suggested: "Read the lines, read between the lines, and read beyond the lines in various literary forms." Any of the guides for college level instruction in developmental reading will suggest the specific skills to be taught, but the teacher will need to adapt these suggestions to the materials that appeal to children.

Individualized instruction. Approximately half of the school time for reading and literature was used in individualized programs such as library reading accompanied by teacher-pupil conferences, or working in reading laboratories and with kits designed for the purpose. One class prepared a room library of several hundred volumes from the children's own collections during which time they devised a system for classifying and cataloging the books. Several collections of Scholastic Literature Units were available for exchange between the different classrooms. The SRA reading laboratories were useful when the reading materials were selected at one or two grade levels higher than the grade in which they were used. Even at grade four level, about half the class ranked at the top of the IIa reading laboratory when it was initiated at the beginning of the year. The umbrella kits for elementary and secondary school use were found suitable at grades four and six levels.[5] Book reports were usually very brief or were creatively devised by the reader. Puppets, dioramas, demonstrations, dramatizations, monologues, role playing, illustrations, and charts were some of the forms selected by the children for reporting on books read. The purpose of the instruction was to take each individual child as far as he was able to go toward becoming a sophisticated reader.

Mathematics

Ability in mathematics was found to range from a lack of multiplication and division facts at grade four level to two years of accomplished mathematical logic at grade six level. Achievement in mathematics was highly dependent upon previous instruction; apparently less learning had taken place on the pupil's own initiative in mathematics than was true in reading or science. At least two extremely brilliant children who learned mathematical logic with enthusiasm did not know the multiplication tables, and one of them resisted the teacher's efforts to help him learn them. No simple categories were found for classifying gifted pupils on mathematical aptitude or achievement; therefore, an analytical approach was needed for planning their instruction.

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[5] Available from the Association for Childhood Education International.

Classes at the demonstration center in Davis and a number of other special classes for middle grades in California used the state adopted books, *Modern Arithmetic Through Discovery* (Silver Burdette Company), plus supplementary and enrichment materials. Supplementary materials included *Math Workshop for Children* (Encyclopaedia Britannica, Inc.), which, with the teacher's manual of instruction, was useful for planning manipulation and discovery activities. *Mathematics Enrichment*, Programs A, B, C (Harcourt, Brace & World, Inc.) for grades four through six offered programmed instruction in sets, geometry, and numeration for individualized and small group approaches. State supplied materials for enrichment of above average pupils included *Exploring Mathematical Ideas*, 4; *Enlarging Mathematical Ideas*, 5; and *Extending Mathematical Ideas*, 6 (Ginn & Company). Also available for each room was the *Student's Glossary of Arithmetical-Mathematical Terms* (Laidlaw Brothers). Special class programs in self-contained rooms usually encouraged pupils to develop special projects such as study of the metric system, binary numeral systems, ratio, graphs, or measures in geography.

Team teaching. The Lompoc demonstration center used a team teaching organization for four of the classes located in two schools. Two teachers shared the special class and a high achievement class on a half-day basis, so that one of the teachers was responsible for the science and mathematics programs for both groups. A team of three teachers regrouped their three classes -- grades four, five, and six -- by a plan that cut across grade lines. Logic was taught two days each week to a mixed group with previous exposure to logic and to another group of beginners. These pupils were regrouped for mathematics, which was taught three days a week. A third group of pupils took mathematics five days each week and did not take logic. Two remaining schools involved five teachers who organized self-contained programs and used materials from the *Madison Project*, *School Mathematics Study Group* (SMSG), and the *Mathematical Logic Project*.[6]

Guidelines. Mathematical guidelines for the Lompoc demonstration center were planned at a workshop in the spring of 1964. The study committee's report suggested the following procedures:

1. *School Mathematics Study Group* (SMSG) materials should be used as the curricular framework.

2. Children should be taught at an accelerated pace, dependent upon the capabilities of the individuals involved.

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[6] Robert B. Davis, *Madison Project.* Mathematics Project Office, Webster College. Webster Groves, Missouri. *School Mathematics Study Group*, Stanford University and Yale University Press. *Mathematical Logic Project*, Patrick Suppes, Director. Stanford University (no date).

3. Provision for review tests and reinforcement of concepts, if necessary, should preclude the danger of gaps in mathematical sequence.

4. Each teacher should begin at the point in the SMSG program where the previous teacher left off. This process would require a flexible curriculum at the secondary level with new course offerings and procedures.

5. Supplementary enrichment materials should be used to provide problem-solving situations that are challenging and satisfying to gifted pupils.[7]

In the experience of this study group, certain characteristics in presently available SMSG materials require adaptation and innovation on the part of teachers if the program is to be fully successful in special classes for gifted children. The suggestions of alternatives in teaching were listed as follows:

1. Repetition occurs at all grade levels. Various chapters in each grade level can be omitted in special classes.

2. Manipulation skills need to be more strongly emphasized.

3. More word problems are necessary.

4. The rational numbers topic is a difficult one as presented in the SMSG; rational numbers should be taught after a review of basic multiplication facts.

5. Geometry should be taught in one block of time, following the skills.

6. In teaching long division, the remainder is not expressed as a fraction of the divisor in the SMSG method. However, both the divisor algorism and the fractional remainder procedure should be taught.

7. More emphasis should be placed on working with other bases.

8. Measuring angles with a protractor should be taught in grade five.

9. An earlier and more rigorous treatment of metric systems is needed than that provided in SMSG. Children should use supplementary materials for learning mathematical concepts and skills.

Because of the insatiable curiosity of the gifted pupil and his deep perceptive ability, the gifted mathematics pupil should continually be offered problem situations, both hypothetical and practical. Complex word problems or puzzle problems are ideal for special class situations; it is extremely advantageous to create problems that involve many disciplines. Physical applications are especially good to show the relationship between math and science and to create other thought situations.[8]

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[7] Mildred C. Robeck, Talent Development Workshop. Report from Lompoc Unified School District and California Project Talent, June, 1964 (mimeographed).

Individualized mathematics. One teacher in an ungraded special class outside the demonstration project individualized his mathematics program for gifted pupils and for average groups as well:

> The purpose of individualized instruction was to provide greater flexibility for the student and from the teacher's point of view allow closer person-to-person instruction which in turn should facilitate cooperative diagnosis.[9]

The diagnostic tests in the state-adopted book were taken by the individual pupil whenever he came to a new unit of study. He then graded his own test, conferred with the teacher, and began a program of each new step where he had pretested at less than 90-percent accuracy. As children completed the Modern Arithmetic Through Discovery at the appropriate grade level, they were counseled to complete supplementary and enrichment materials on special topics according to their separate purposes. Such materials included the following:

- Teaching Machine Programs. Min/Max Machine, Teaching Materials Corp., Grolier, Inc. "Measurement"; "Beginners Algebra"; and "Modern Mathematics."
- Exploring Math on Your Own. St. Louis, Missouri: Webster Publishing Company. "Topology"; "Short Cuts"; "Sets, Sentences, and Operations"; "Pythagorean Theorem"; and "Computing Devices."
- Martin M. Moskowitz, What Are the Chances: An Introduction to Probability. New York: Macmillan Company.
- Mathematics for Junior High School. Book 1. Palo Alto, California: Silver Burdette Company.

The special class programs in mathematics had several features in common: basic curriculum at grade level, enrichment experiences, and acceleration of content.

Science

The purpose of the science program in the special classes was to demonstrate a rationale of teaching and learning problem-solving behavior in which the pupils would (1) carry on the processes of inquiry; and (2) apply knowledge and skills to problems not previously encountered.[10]

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[8] Ibid.

[9] Martin Robeck, Jr., Project on Learning Diagnosis, Report from Vieja Valley School, 1966.

In the demonstration center at Davis, one special class teacher used the inquiry method to enable pupils to discover for themselves the principles of science as units were developed in physical science, physiology, biology, chemistry, and an "ology" unit that included meteorology, geology, anthropology, archaeology, and paleontology. One approach used was to establish a block of time when pupils could study sciences other than the major class units. The teachers did research and planned projects either individually or in small groups. A portable science laboratory was used extensively.[11]

The study committee on science curriculum at the Talent Development Workshop in Lompoc reported the following for the conduct of their program:

> The study group concurred that their purpose in special classes was to teach children how to overcome the obsolescence which quickly characterizes much of the content in conventional science textbooks. Discussions were directed to new state materials, including some of the "grand ideas," which do not quickly become obsolete. Topics to be included in science curriculum frame [work] for the gifted would correspond with the grade levels indicated for all students in the Lompoc Science Guide.
>
> Fourth Grade: Physical Forces, The Atmosphere, Nature of Space, Nature of Weather, Structure of Living Things
>
> Fifth Grade: Matter and Energy, Electricity and Magnetism, Sound and Light, Human Organism
>
> Sixth Grade: Astrology and Astronomy, Producers and Consumers, Soil Chemistry
>
> The district science guide is sufficiently open ended to provide activities for the gifted classes. It is expected that this material will provide a common experience for the entire group but that individual projects will carry the concepts farther for some individuals and will permit others to follow specialized interests.
>
> The program will deal with concepts, ideas, and scientific methodology, rather than factual knowledge as such.

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[10] Joseph P. Rice and Paul D. Plowman, "A Demonstration Center with Differential Programming for Gifted Pupils in California in Grades One Through Nine," California Schools, XXXIV (May, 1963), 139-54.

[11] Vivian S. Sherman, Interview with Mrs. Marla Donnell. Report on California Project Talent. Sacramento: California State Department of Education, 1964 (mimeographed).

- Students should learn the methods of science by conducting investigations directly.
- Some problems should be attempted, the answers for which are unknown to students.
- Whenever feasible, the data available in nature should be used.
- Children should be taught how to formulate conclusions based on what was observed.
- Problems ought to teach some significant ideas which will not become obsolete quickly.[12]

A teacher of grade six in Lompoc, who taught science to several special classes, used an experimental approach to biological science in which the children designed and carried out controlled experiments to discover the basic biological needs of living things.[13] (See the "Biological Science" unit.)

Team teaching. A team of teachers at La Honda Elementary School in Lompoc worked extensively with units from Educational Services Incorporated including, "Behavior of Mealworms," "Mystery Powders," and "Animal Skeletons."[14] As part of the animal unit, a study excursion of 300 miles was made to the Los Angeles Museum. The children were prepared for the trip by being given the following letter of instruction with spaces in which they were asked to supply information:

> As we ride to Los Angeles, try to find examples where, in your opinion, man has altered his environment to better serve his needs. . . . Jot down some observations that you make as we ride to Los Angeles and return to Lompoc this afternoon.
>
> 1. Do you see any examples of glyphs?
> 2. How many birds can you list that you know? Have you seen one that you do not recognize? Describe it.
> 3. Have you seen a butterfly? A flower?
>
> We are planning to visit Hancock Hall, Exhibits on Conservation, Plants and Animals of California, Dioramas showing Historical Events in California, and so forth.

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[12] Mildred C. Robeck, Talent Development Workshop, op. cit.

[13] Steve Straight, Westwings Elementary School, Vandenberg Air Force Base, Lompoc.

[14] David Webster, Educational Services Incorporated, 108 Water Street, Watertown, Massachusetts.

When we go into Hancock Hall, observe the animal skeletons. List animals no longer found in California. List skeletons of animals found in tar pits that are still in California. As you look at the skeletons, can you tell whether the animal crawled, walked, hopped, or flew? Can you tell if the animal is carnivorous or herbivorous? How? Look at all of the dioramas of animals, then choose one. List animals found in the diorama you have chosen. Why do you think these animals live together? Do you see evidence of one animal's dependence upon another? Describe environment briefly. How is the animal fitted to live in his environment?[15]

Self-contained class. One grade five teacher in the demonstration center at Lompoc initiated numerous units that resulted in unusual learning activities for the pupils. One such project, "Learning in Rats," resulted in well-defined hypotheses, well-controlled observations, the precise recording of data, and some very imaginative interpretations of results, which in turn led to further hypotheses to be tested. Pupils made or assembled their own equipment: a maze patterned after Wechsler's Maze Test, a stopwatch for timing the actions of the rats, and cages equipped for feeding and exercising. The group then proceeded to a study of human learning involving Guilford's "Structure of Intellect." This direct approach to thinking processes proved a valuable and effective way to stimulate the children's evaluation of their own learning and to affect their appreciation of uniqueness in human abilities.[16]

Ungraded class. Because of the number of special classes that operate in California as combination or ungraded groups, some additional examples are incorporated into the present report. In one individualized program in science, the teacher, trained in Suchman's inquiry technique, wanted individuals to experience their private discoveries in the way some children experience the "ah ha" moment when the teacher conducts a group discussion.[17, 18] He wanted the science-oriented pupils to refine their techniques as they explored their interests, and he wanted the uninitiated and uninterested pupils to learn to conduct science projects on their own. The major purpose was to teach children the scientific method. The program was launched with the distribution of a list of topics from which the pupil might elect a project, unless he had one in mind already. In accordance with the procedure, the pupil then read widely and was encouraged to try the procedures described in his reading for observing scientific principles and to demonstrate these to the class. Through group evaluation, the children learned to define, design, conduct, record, and interpret a controlled experiment. Children would proceed individually, or in small committees, from resource-stimulated interests to projects of their own. The teacher was always available for individual consultation and for helping to secure materials. As a pupil completed one project -- usually in two weeks to five months -- he began another or a related investigation. All pupils were able to produce at a level of sophistication that represented growth in inquiry and independence according to ratings on a "Science Project Score Card." (See the "Science Projects" unit.)

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[15] Dorothy Wagner, teacher of grade four special class, La Honda Elementary School, Lompoc.

[16] Ruth Hadley, teacher of grade five special class, Westwings Elementary School, Vandenberg Air Force Base, Lompoc.

[17] Martin Robeck, Jr., teacher of a special class at Vieja Valley Elementary School.

[18] J. Richard Suchman, The Child and the Inquiry Process, a paper presented to the Eighth ASCD Curriculum Research Institute, Western Section, Anaheim, California, December 3, 1962.

Social Science

Social science curriculum for special classes generally followed the state sequence at the regular grade level, but was extended horizontally and in depth to challenge rapid learners.[19] Usually language arts, current affairs, and student government were incorporated -- whether the group was studying California at grade four level, the United States at grade five level, or world geography at grade six level. In an effort to teach children effective ways to deal with knowledge, most project teachers implemented a learning theory structure such as Bloom's Taxonomy of Educational Objectives or Guilford's "Structure of the Intellect."[20, 21] Several units of study emphasized the methods of investigation used by a particular branch of social scientists, while other topics of study were developed from broad, humanitarian orientations. Representative projects developed with gifted children are summarized as follows:

Anthropology. Grade four studies of early California offered an unusual opportunity to consider the specialized techniques and contributions of anthropologists to man's understanding of himself. From the generalizations suggested for study in California schools, a theme which was inherent in the context of Indian life was selected.[22] One instructor, assisted by her student teacher, based learning sequences on Guilford's intellectual processes; they conceptualized this model so well that pupil divergent and convergent productivity became characteristic of content areas other than social science. The special classes in Lompoc utilized archaeological projects, local collections of Chumash artifacts, resource persons, and anthropological publications.[23] (See the "Scientific Methods in Anthropology" unit.)

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[19] Social Studies Framework for the Public Schools of California. Sacramento: California State Department of Education, 1962.

[20] Taxonomy of Educational Objectives Handbook I: Cognitive Domain. Edited by Benjamin S. Bloom. New York: David McKay Company, Inc., 1956.

[21] J. P. Guilford and P. R. Merrifield, The Structure of the Intellect Model: Its Uses and Implications. Reports from the Psychological Laboratory, Monograph No. 24. Los Angeles: University of Southern California, April, 1960.

[22] Mildred C. Robeck, How the Anthropologist Studies Man: The Chumash Indians. California Project Talent. Sacramento: California State Department of Education, December, 1965 (multilithed).

Political science. Because the state of Hawaii evolved as a geographic entity through all the major political forms of government, the fiftieth state proved excellent content for study as political history. With this unit, one grade five teacher used Bloom's taxonomy and his own questioning techniques to direct the class beyond a knowledge of content to such modes of thinking behavior as interpretation, application, analysis, synthesis, and evaluation.[24] Gifted children in the middle grades are nearly all so well read in the social sciences that they are eager to go beyond the usual history and geography study to a study of other social sciences. Skillful teachers find many opportunities for directing their pupils' questions toward an understanding of the relationships inherent in all social science content.

Inductive geography. Several classes studied a unit on the imaginary continent of Melania. Geographical facts were supplied in the unit regarding altitudes, latitude, winds, natural resources, and native tribes. Discovery by the Farwans was dated at 1650, and major technological advances were dated from the cotton gin in 1790 to atomic energy in 1945. The task for the pupil was to add to the information supplied through their own reading and to come to a series of conclusions: Where will the main railways be located? (level 1); what reasons will spur the Farwans to push farther into Melania in the first hundred years? (level 2); how will the new inventions affect the growth of Melania? (level 3); and how will foreign trade change between 1850 and 1860? (level 4). Pupils went on to devise other imaginary continents and to summarize their development.[25]

Student government. Class government was used by a project teacher in the Davis demonstration center as the framework within which to teach civic, personal, and social responsibility. She described the program as follows:

> The children elect officers who play a big part in deciding what the classroom needs. This year we patterned our self-government after the three branches of the United States government and conducted our campaigns with political conventions, elections, and nominations. The children are all involved in their government. We have a supreme court with associate justices and a chief justice. The executive branch consists of a president, vice president, and a cabinet. The cabinet consists of several different

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[23] Diane Nishikawa, special class teacher at La Canada Elementary School, Lompoc.

[24] Gerald Schockmel, teacher at La Honda Elementary School, Lompoc.

[25] Mrs. Doris Ishiki, teacher at La Honda Elementary School, Lompoc.

secretaries which the class created, such as secretary of fine arts, physical education, and so forth. Then we have a congress made up of a senate and a house of representatives; these people are elected by the states. We divided the class into two states; the whole class is a country. We change offices four times a year so pupils get an opportunity to work at different levels. Everyone is really learning actively what it means to have a representative government.

A weekly club meeting has always been a part of my [regular] classes, but this . . . is more meaningful to the [special class] pupils. The meeting is held every Friday and is conducted by the officers. The first portion is a business meeting, followed by a program. The program has certain restrictions; it must be both educational and creative. The business meeting is very important to the children . . . [as they solve] their problems of the week. . . .

The program is usually made up of things that have originated in the free period during the morning. In the first free period, there were many children working in art. There is a certain nucleus who have always chosen science, a few have chosen math from time to time, and some have chosen creative music. Then there was one group interested in dramatics -- four or five girls who started in the first free period. After about two weeks, a group of boys got brave enough to set up their own dramatics group. Dramatics has been the most popular artistic expression of all the things done in free period. Some of the children rotate back and forth. Others stay with the same group week after week. But they have become much freer and really enjoy doing things in the dramatics-arts field. . . .

This year I came up with the idea of having everyone on a different committee so four planning committees were organized. We have one in world affairs, one in library, one in physical education, and one in fine arts. We have a chairman of each of these, who is also a member of the president's cabinet. Everyone in the class is on one of these committees, and they have the sole responsibility for meeting certain responsibilities in their committees. The physical education committee plans the week's P.E., and they also make up the teams. These must be fair because they have to be approved by both houses of congress or we don't play ball that week. The children prefer this way of choosing teams because there are fewer hurt feelings. The world affairs group organizes current materials and plans discussions. The library committee has the responsibility for maintaining the class library, organizing a card file, and sending away for materials that would help us in our various areas of research. The fine arts group plans the music with me and also plans some art. They lay out the bulletin boards in this area. . . .

We do quite a lot of discussion in world affairs. In this area, the children submit problems for discussion. Then they're given a week to do research on the topic. I tried last year having the whole group together for these discussions. I like to use pupil leaders for these discussions, but it didn't seem to work too well because a certain nucleus of children always dominated the discussions. So this year I tried having three buzz groups, each with seven members. There are pupil leaders for two of the groups each week so they get a chance at being both a follower and a leader.[26]

The reader will note that this program extended over several subject areas besides social science.

Art

Art experiences for gifted pupils were sometimes directed by the teacher, particularly in the use of new media; were sometimes the mode of presentation for book reports or units of study; and were sometimes the child's personal choice of a free period activity.

A project talent workshop for teachers in the Lompoc demonstration center involved them in direct experiences of media which were new to them at the time. Some of the materials selected and demonstrated by Richard Fischer, the art consultant, are described below:

Acrylic-vinyl copolymer paint. This product is available in tubes or jars, may be used like oils or water colors, and has the advantage for children of being water soluble.

Nuvon art fabric. This material is relatively inexpensive, comes in various weights, and is suitable for murals and friezes in paint or pastels.

Sculpt-Metal modeling material. This product covers a variety of materials such as wire, wood, or mache. It is manageable by children who can build in layers to create a satisfying piece of sculpture.

Modo-Clay. This clay comes ready for use, holds the desired consistency for several periods of work or storage, and hardens without firing.[27]

Gifted children were not equally talented in art or equally interested in working with art media. As a group they responded exceedingly well to intellectual approaches through the study of art theory and the history of art. Under similar opportunities for self-expression, the productivity of special classes far excelled that of regular classes in the proportion of original pieces of good composition and exciting content.

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[26] Mrs. Marla Donnell, special class teacher, North Davis Elementary School District.

[27] Acrylic-vinyl copolymer paint, Introductory Kit #105. New Master Art Division, California Products Corp., 169 Waverly Street, Cambridge, Mass.; Nuvon Company, 800 W. 4th Street, Kansas City, Mo.; The Sculpt-Metal Co., 701 Investment Blvd., Pittsburg, Pa.; and Modo-Clay, Montgomery Studio, Northbrook, Pa. 19361.

Areas of Emphasis

The line between separate and correlated subjects tends to make an artificial division when the teachers are oriented to the interrelatedness of knowledge and the pupils are intellectually curious. Language arts were taught in the demonstration centers as communication within subject areas, including logic. It comprised approximately half of the curriculum in the special summer classes in humanities.

A group which functions at a high verbal level generally may seem deceivingly unneedful of structured lesson sequences in speaking, listening, writing, spelling, and grammar. Analytical observation of the individual performance of pupils, however, will show many discrepancies between the child's ability and his levels of functioning in specific communication abilities. One manifestation of pupil interest in current affairs was the class newspaper. One special class teacher explains as follows how she integrated language skill development into the total program:

> I've tried several kinds of class newspapers and to me the easiest, the simplest, and the most effective is what I call the bulletin board newspaper. We have one bulletin board which is our newspaper, rather than having a dittoed form which means endless hours of typing and distributing. The bulletin board is arranged in columns. We have six editors in addition to the editor-in-chief. They cover world news, class news, editorials, features, sports, and comics. The children plan and write their own material. Each pupil is on a newspaper committee . . . .
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> Each child has a notebook in which he keeps his own reading record. It's a very abbreviated kind so that it doesn't get laborious. They just record such things as the title, the author, and the subject, and a short evaluation of the book in which they criticize what they have read. In addition each has a reading vocabulary book. I've tried to simplify the method of writing down words that aren't known. A piece of scratch paper is used to jot down the page number and the word. We later have a period in which we all stop to work on vocabulary. In this way each child is building his own vocabulary. . . .
>
> A language book, as such, doesn't seem to fit the needs of this particular class. I have to go in several directions to find methods and materials, and most of it is just devised by myself on dittos as we need to work on particular skills. Some of it is done individually through notes to the child who has a problem that shows up in a paper. We discuss it together. I find a problem that is common to several in the group; we discuss it in small groups. I go through the book and see what skills are minimum for the grade level and make sure that the children get these. . . .
>
> I teach spelling from, first of all, the SRA spelling kit . . . and it has proved quite successful. Children who have spelling problems are quickly identified and have to spend more time with spelling. I've seen marked improvement in some of the children who have spelling problems. . . . The children record all misspelled words in their individual spelling books.

> In addition to SRA, we also periodically develop our own spelling lists . . . around various topics. For instance, we had one topic on world affairs, and we picked out words we use in this field. The children enter the words in their vocabulary dictionary, find meanings for the words, and take a spelling test on them.
>
> One creative writing activity involves the children's looking at a humorous picture and then writing a caption and a short story describing the picture. I read to the class the stories without names and the children vote on the picture story of the week, which is featured in our newspapers. This activity has helped stimulate creativity. . . . Editorials are written periodically in connection with world affairs; again the children vote on the best ones. They have developed considerable skill in editorial writing. They have also drawn political cartoons. The children write research reports in connection with social science or science. . . . Another feature of language arts is the book that the children write. This is an all-year project and they choose their own topics. It can be fiction or nonfiction, and they start by doing research and background reading. A local author of children's books has helped to motivate the project. The children bind their own books, which are typed . . . . We budget one language arts period a week for working on the books.[28]

The materials appropriate for this kind of group at this grade level were abundant. For a linguistic approach to grammar which will present the structure of language inductively, gifted pupils might be assigned content from the junior high school textbook, Discovering Your Language.[29] For children whose language skills need strengthening in specific areas, the school might provide a listening post, and the Listen and Read series of taped lessons on such varied topics as "Paragraph Keys," "Figurative Language," and "Shifting Gears in Reading."[30]

Volumes of books, essays, stories, reports, autobiographies, biographies, and poems were written by special class children in the demonstration centers during the project. Poetry was especially popular because ideas could be set down quickly, imaginatively, and rhythmically -- without extensive handwriting. Outstanding work in this area was done by many pupils in the special classes. A few samples (of hundreds) written by grade six pupils in Lompoc indicate the ability of gifted pupils to express their ideas in poetry.[31]

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[28] Marla Donnell, teacher of a special class in Davis.

[29] Neil Postman, Harold Morine, and Greta Morine, Discovering Your Language. New York: Holt, Rinehart and Winston, Inc., 1963.

[30] Lorena A. Anderson and others. Listen and Read. Huntington, N.Y.: Educational Developmental Laboratories, 1961.

[31] Phyllis Smart, teacher at La Canada Elementary School, Lompoc.

MONEY

Money means to different people
Many different things,
To some it means food to eat
To some diamond rings.

To some money buys a mansion
And a wife,
To some money brings a chance
To live his life.

Money brings to some a car or
A vacation,
Money may bring to others
A college education.

To the girl across the street
Money will buy a dress,
But me, I know, money
Can't buy happiness.

-- Jean Morris

KINDS OF BOOKS

There are many kinds of books,
Some about robbers,
Some about crooks
They're large and small,
Short and tall
From history to geography
And fiction to biography,
Some to read for reports;
Some to read for fun
But it doesn't matter to me
Because I like them all.

-- Patty Starke

STEEL

Out of the ground, out of the earth,
That's how steel is given its birth.
Taken out of the earth rough and hard
Melted down as soft as lard,
Hot and melting then cold as can be,
Finally sent out of the factory,
Used in trucks and boats and cars,
Used in rockets sent to the stars.
Used in hundreds and thousands of things,
All from the ground
The lowliest of things.

-- Kent McManis

Group Counseling of Gifted Children

Group counseling patterned after the counseling-instructional program for junior high school students in the San Juan Unified School District was coordinated with classroom work at the Davis demonstration center and was conducted by the research project consultant. The teacher and the counselor planned discussion topics which were particularized for emotionally healthy superior pupils who needed an intellectual exchange of their common problems. Groups of eight or ten met every other week with the counselor, while the remainder of the class worked with the teacher on individual projects. The children anticipated their "discussion groups" with eagerness.

The objectives of the counseling-instructional phase of the program were both cognitive and affective.[32] Cognitive goals for pupils included applying knowledge, organizing ideas, and building relationships through adult guidance of groups that were small enough to provide for the fullest participation possible.[33] Affective objectives included the organization and communication of the pupil's own value structures. Through conferences which followed the discussion sessions, the teacher and the counselor together stressed the following growth areas where cognitive and affective domains overlapped: self-understanding, social conscience, quality of conscience, creative thinking, and love of learning.

During the small group counseling periods, the pupils had an opportunity to discuss controversial issues, to raise questions about life or philosophy, and to test their aspirations among peers.

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[32] David R. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia, Taxonomy of Educational Objectives. Handbook II: Affective Domain. New York: David McKay Company, Inc., 1964.

[33] Louise M. Bachtold, Counseling-Instructional Programs for Intellectually Gifted Students. California Project Talent. Sacramento: California State Department of Education, 1966.

Chapter 5

Education of Teachers of the Gifted

An educational program is only as good as the instruction that goes on in the classroom. Administrative provisions for special classes, brilliant pupils, and unlimited materials make the teacher's work easier or more enjoyable; but material resources cannot substitute for effective teaching. By contrast, the perceptive and skillful teacher can compensate, as far as the child is concerned, for an unfriendly atmosphere, shortages of library resources, or underdeveloped curricula -- at least for a time. Experience in Project Talent, however, indicated that while excellent materials were relatively abundant for a price, teachers for the gifted were scarce and hence priceless. Although exceptional teachers were found and lured into project work, they left an unhappy void where they had been working.

In California, legislative and educational groups have discussed at various times whether a specialist license should be required of teachers of gifted classes -- a certificate or credential of the kind that is required of teachers of the mentally retarded or of special teachers of reading. Special preparation for teaching the gifted is impracticable at the preservice level because the needs of particularly gifted children overlap those of other children in many areas. Also, the teacher of gifted children needs some points of reference to average behavior if the materials are to be chosen well and the instruction is to be geared appropriately. Gifted children are, first of all, children with the same needs as other children of their age for new experiences, social interaction with peers, reinforcement for learning, support for novel production, and physical activity. Experience with typical classes gives the teacher the background to find and to fill gaps in learning, the patience to help children with the subjects in which they feel inadequate, and the skill required to organize individualized and small group instruction.

Following the acquisition of such experience, those who are to teach gifted children need opportunity to plan new guidelines, to become familiar with the techniques suited to special classes, and to interact with teachers who have similar professional challenges. They need to observe other teachers at work in situations similar to their own, to review new materials, and to have other people reinforce their own observations and experiences. Opportunities for these kinds of experiences should be planned for and provided by the administration of the school district.

Inservice Training

California Project Talent staff members worked in conjunction with representatives of school districts to provide inservice meetings and workshops for teachers of the gifted. They also cooperated with teacher education institutions to provide workshops for course credit.

Meetings with Project Teachers

Research project consultants and district coordinators held after-school and afternoon meetings with the ten project teachers in the Lompoc demonstration center and their building principals. Four meetings a year were scheduled. A special consultant or resource person was engaged for each meeting, either a specialist in a subject matter area or an expert in gifted child education. Meetings were arranged with both pupils and teachers when the resource persons came from disciplines such as art, children's literature, marine biology, political science, social science, and puppetry. One schedule which functioned successfully allowed the consultant to spend the morning with different groups of children, the early afternoon with district coordinators, and the late afternoon with project teachers. Curriculum and program consultants utilized in the inservice meetings included Mary Broderick, Abraham Fischler, Mildred Goertzel, Victor Goertzel, Leon Lessinger, Paul Plowman, and Joseph Rice.

In the Davis demonstration center, where only one class and one teacher were involved, the interaction between the district and project staff members was frequent and informal.

Workshops

Workshops for project teachers varied in duration from one to three days. They were attended with or without stipend, depending upon responsibilities as participants. Workshops that required a fee from the enrollees carried credit; these workshops are described below as courses.

Three-day talent development workshops were held in Lompoc in 1964 and in 1965, immediately after the regular school term ended. They were established to assist the special class teacher in preparing for the coming academic year. The first year, the group examined the district's curriculum guides in social science, mathematics, and science; the group also recommended adaptations for the special classes of mentally gifted children. The intent was to allow curricular freedom that would permit pupils to function at a high level while providing content that would fit logically into the vertical and horizontal framework of the curriculum. Initial decisions provided for social science content to follow the state framework with the addition of enrichment. Mathematics would be accelerated and enriched with logic. The study groups next examined specific content and materials for suitability in the program. Dr. Lessinger and Dr. Plowman served as consultants for the three-day workshop. Since half of the teaching staff was new to the program, some of the discussion involved orientation of new members and evaluation of previous work. Local coordinators in each subject matter area met with the committees, as did the principals of the schools where the special classes were located.

The 1965 workshop was organized for whole group and study committee sessions. New materials in literature were evaluated, a new "discovery approach" unit was written for science, and social science units were refined. One innovation which worked successfully was the workshop in art. Between sessions of writing and listening, periods were scheduled when new art materials were demonstrated by the art coordinator. The teachers then experimented with the new media. Each study group reported a summary of discussions and decisions at the final meeting of the whole group.

College Courses for Credit

In the summer of 1966, eight California campuses offered courses in teaching gifted children or teaching exceptional children. Summer workshops and institutes were offered at several state colleges, private colleges, and a university. The programs varied from drama festivals to new mathematics, inquiry training, creative dramatics, and economics for teachers. Twenty-six credit-bearing activities were listed by the institutions as preparation for teaching gifted children. All but eight of these courses, however, appeared to be aimed at teachers of the full spectrum of student ability or at teachers of those at the low end of the continuum. Quite probably other teacher education institutions would include courses or workshops for teachers of the gifted if they could expect adequate enrollment.

Cooperative Programs in Teacher Education

Two programs for teachers of the gifted were developed through cooperation of a teacher education institution, the State Department of Education, school districts, and the staff of the talent development project. Both programs combined lecture, discussion, and laboratory experiences for post-graduate level credit.

California State College at Los Angeles, under the direction of Kenneth Martyn, offered a block program in three related areas: psychology of exceptional children, education of gifted children, and a choice of academic content. Paid fellowships were provided for selected candidates who assisted the regular teachers in the special summer classes in the Pasadena City Unified School District and other adjacent school districts. The cooperating schools provided classroom observation opportunities for other block college class members who were not participants in the special summer classes.

Sacramento State College, the San Juan Unified School District, and the California State Department of Education coordinated their summer programs for gifted pupils and teacher education.[1] Differential programs from

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[1] Louise M. Bachtold, Report of a Pilot Summer Session Workshop Demonstration, California Project Talent. Sacramento: California State Department of Education, 1964 (multilithed).

California Project Talent were demonstrated by a selected group of project teachers from various parts of the state and other teachers who were experienced in work with gifted children. The program was of five weeks' duration, cost a $57 enrollment fee, and offered four quarter-unit credits. Roger Bishton directed and Marian Faustman coordinated the workshop which enrolled teachers, principals, and coordinators of programs for the gifted.

Individual projects. Each teacher-student who was enrolled completed a project for use in his own district situation; this project included a format for case study, a unit to implement one of the models for intellectual functioning, a report for the superintendent and the board, a plan for individualized mathematics, or a discovery approach to foreign language.

Library. Library resources drawn from the college, the project offices, and Dr. Bishton's private collection were much more appropriate for the purpose than most college library collections. An air-conditioned high school library was made available for committee discussion, as well as adjacent conference rooms.

Observations of teaching and counseling. Six classes of gifted children were taught daily, and the class schedule was alternated to permit daily observation of different aspects of the program from ungraded primary to grade eleven. The observer groups were kept small so that contact with demonstration teachers and students was frequent and informal. One opportunity offered was the observation of group counseling sessions, which were part of the program in grades seven, nine, and eleven.

Resource persons. Utilizing the personnel of the college, the State Department of Education, California Project Talent, and school district personnel a series of lectures was presented by speakers with an unusual background in the topic selected. Three consultants were on hand daily to meet with discussion groups or to confer with the teacher-students on individual projects.

Professional Training and Teaching Effectiveness

Despite criticisms of the lack of practicability of coursework for teaching, the tightly designed studies based on performance in the classroom have indicated that teachers with more teaching course units have greater classroom skill than those who were not fully prepared or than those who had substituted academic courses for teacher education courses. At least three studies have significance for planning the professional portion of the education for teachers of the gifted.

Three researchers in three states -- New York, Florida, and California -- conducted research and reported data concerning the effectiveness of various kinds of professional preparation for teachers. Each of the investigators minimized the unidentified variables in the teachers by the use of some combination of the following factors: large samples, matched pairs, and control groups. Each investigator employed preestablished criteria for the evaluation of the teachers. Two researchers minimized the variable injected by observers through the use of a number of raters, and the third researcher avoided the possible "halo" effect within professional education by comparing the observations of a team of educators with those made by a team of observers selected from other professions.

Beery's Study of Beginning Teachers[2]

John R. Beery studied two groups of 74 beginning teachers who were selected and equated on all factors except the kind of college preparation they had had. One group met all of the requirements for full certification for the state of Florida, including the prescribed courses in sequence. The other group members were provisionally certified because they lacked some or all of the prescribed professional education courses, for which they had substituted liberal arts courses. He was attempting to find out whether the substitution of liberal arts courses for all or part of the education courses provided better training for prospective teachers.

Observations were made five times during the school year by observers trained in the use of a special checklist which had been developed for this and other studies. Two classroom visits were made by people engaged in teacher education, and two visits were made by observers representing law, civil engineering, social service, and medicine. The fifth visit was made by a full-time researcher.

Completion of the professional education courses in sequence was reflected in more effective teaching as rated both by observers outside the profession and by persons responsible for teacher education. Substitution of letters and science courses for education courses resulted in less effective teaching on the part of the teachers observed.

LuPone's Study of Certified and Provisional Teachers[3]

Orlando J. LuPone compared elementary teachers who were provisionally certified because of lack of education requirements with teachers who were fully certified by the state of New York. Six categories of 40 teachers each made up the sample: provisionally credentialed teachers in each of the first, second, and third years of teaching; and fully credentialed teachers in each of the first, second, and third years of teaching. These matched pairs of fully certified and provisionally certified teachers were rated by the principal of the building they shared. Ratings were based on a 60-item checklist designed to cover seven areas of teaching competence.

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[2] John R. Beery, Professional Preparation and Effectiveness of Beginning Teachers, Coral Gables, Florida: University of Miami, 1960.

[3] Orlando J. LuPone, "A Comparison of Provisionally Certified and Permanently Certified Elementary School Teachers in Selected School Districts in New York State," Journal of Educational Research, LV (October, 1961), 55-63.

Significant differences favoring the fully certified teachers were found in the areas of preparation, planning, and management; subject matter; instruction; pupil-teacher relations; and evaluation. No significant differences were noted in human relations and parent-teacher relations.

The investigator concluded that permanently certified elementary school teachers received better ratings than those with equivalent amounts of higher education but lacking the specific requirements for permanent credentials. During the first three years of teaching, persons who were fully certified showed superiority in the ability to organize and plan effectively, skill to translate subject matter into living experience, proficiency in using related materials in classroom instruction, an understanding and more sympathetic attitude toward children, and adequate use of specialists engaged by the school.

Bates's Study of Teachers in California[4]

Ernest Bates, in 1961, analyzed the differences between life diploma, general elementary, and provisional general elementary credential holders in several school districts of a large county in southern California. In this study, 350 teachers were rated by curriculum supervisors on 22 items in the areas of school management, teacher-pupil relationships, teacher personality, skill as an instructor, and professional attitude.

Rating results indicated that teachers with life diplomas or regular credentials provided more healthful and more appropriate classroom environments; better teacher-pupil relationships; and greater skill in the teaching of social sciences, science, and arithmetic than the group with provisional credentials. Teachers with life diplomas showed superiority over both other groups in care of supplies and equipment, class "climate," skill in teaching reading and the language arts, specific professional attitudes, and tact and humor. In no categories were the provisional teachers superior to either the regular credential or the life credential holders. Items on which the three groups showed no differences were neatness, voice, initiative, and "modern approach to education."

Implications for Teacher Education

This review of the research indicates that in Florida, New York, and California, elementary school teachers with full professional preparation were rated superior to teachers with less than complete teacher education, at least for the first three years of teaching. This statement held true even when liberal arts courses were substituted for the professional education courses. None of the researchers discovered any area of competence considered important to good teaching in which provisionally licensed teachers were more effective than fully qualified teachers. Groups appeared to be similar in such personality characteristics as dress, voice, and in relationships with adults. Even the handling of subject matter was more effectively accomplished by the fully credentialed teachers, perhaps because of the range of content taught in elementary school classrooms. Judgments of superior teaching appeared to have been amazingly consistent, whether made by principals, curriculum supervisors, or observers from outside the field of education.

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[4] Ernest C. Bates, An Inter-Credential Analysis of Teacher Performance and Certification in Elementary Schools. Paper presented at the California Educational Research Association's Thirty-Ninth Annual Conference, Palo Alto, California, March 3-4, 1961.

In some California school districts, provisionally credentialed personnel have been appointed to teach special classes. Conditions which have contributed to this situation are as follows: (1) a shortage of qualified elementary school teachers; (2) the obvious need of the gifted child for a teacher who is highly knowledgeable or specialized in the subjects he teaches; (3) the ability of some individuals to manage a group of children without formal preparation; and (4) a lack of incentive for a teacher to undertake specialized work in teaching the gifted.

The expressed desires of gifted children for understanding, a relaxed atmosphere, freedom to create, and individual attention suggest a classroom organization and knowledge of child development that is more likely to be seen in the work of professionally prepared teachers. Considering the added necessity for academic preparation beyond the usual requirements of the elementary class, good planning would seem to call for the selection of a team of fully credentialed teachers who together had background in the crucial areas of social science, science, mathematics, language, and the arts. Within the new credential structure in California, this kind of teacher selection should be possible if appropriate incentives are offered for further specialization in teaching gifted children.

Course Materials for Teacher Education

The materials available for workshops and college courses in the education of teachers of the gifted are extensive. Books and articles vary in sophistication, depth of treatment, and research orientation. Much pamphlet material, of varying degrees of usefulness, is available. Selected references will be found at the end of this report.

The following topical outline reflects the literature of the field, the interests expressed by teachers at the statewide workshop, and the writer's experience in preparing material for the field projects. The content is organized into five blocks of related topics which might be used in five workshop weeks, ten quarter weeks, or 15 semester weeks.

Dimensions of Talent

Interpersonal differences. Characteristics of academically talented children; unique needs of the "one in a thousand"; and limitations of IQ tests

Intrapersonal differences. Highly creative children; Guilford's "faces of intellect"; cultural motivations; and gifted underachievers

Early identification. Evidence of high potential in young children; evidence of changes in school learning potential; cultural stimulations; and teaching children to conceptualize

Case study methods. Screening and nomination; testing and selection; profiles of intellectual functioning; and observing and recording pupil behavior

Rationale for special programs. Optimal education for all children; community acceptance of gifted-child programs; and keeping the program inconspicuous

Development of Talent

Scholastic talent. Discovery methods; Suchman's "inquiry training"; problem solving; and Bloom's classification of knowledge

Innovative talent. MacKinnon's "originality, adaptability, and productivity"; Bruner's "process of transformation"; and Guilford's "divergent thinking"

Teaching creative behavior. Personality and creative production; a learning-motivation model; reinforcing creative effort; and building self-image as one who creates

Classroom climate and organization. Teacher empathy; free choice period; individualized work; responsible permissiveness; flexible schedule; and supportive evaluation

Maintaining creativity. Problems of peer acceptance, social pressure, and self-imposed conformity

Planning New Curricula

Social science. Scientific methods of exploring social phenomena, humanities, or discipline orientation

Science. Individual or small group experimentation; exploration; hypothesis formulation, design, testing, and interpretation

Mathematics. Discovery approaches to mathematical theory and logic

Literature. Reading the lines, between the lines, and beyond the lines

Creative writing. Critical analysis as an approach to writing poems, short stories, essays, fables, and dialogue

Aesthetic appreciation and production. Combining intellectual stimulation, new media, and self-direction

Foreign language. Spelling, grammar, and programmed learning for gifted students

Programs and Policies

Acceleration. Research on advanced placement; Terman studies of accelerated students; selection of accelerated students; and special summer program in lieu of a grade

Enrichment. Cluster groups; interest centers; use of resource persons; and Bloom's "intellectual abilities"

Special class. Research on special classes; team teaching; social interaction; and individualized instruction

Counseling-instruction. Organization of counseling groups; Krathwohl's "affective domain"; discussions of aspirations and values; and personal and social problems

Policies. Teacher nomination; articulation of special program; student use of materials and equipment; and staff relations

Evaluation and Research

Informal evaluation. Self-analysis by teachers; grading practices; evaluation discussions with pupils; and decisions regarding school records

Techniques of observation. Instruments for classroom observation; use of a learning model to observe pupils; and characteristics of teachers as a program variable

Statistical evaluation. Problems of test ceiling; regression toward the mean on retests; and skewed distribution

Unanswered questions

Current and significant research

Chapter 6

Evaluation Procedures

The rationale for the inclusion of special classes as a prototype for California Project Talent was based on the marked success of the grades five and six special class in the State Study directed by Ruth A. Martinson.[1] The results of that three-year project were statistically significant gains in pupil achievement and favorable reactions from pupils, parents, and professional staff. Like most dynamic educational programs, the demonstration center classes were unique to the districts in which they were established, and they differed in unknown degrees in their effectiveness. Information from previous research has proved the possibility of academic and social advantages to gifted children enrolled in special classes. The present demonstration project was designed to test the effectiveness of the special class prototype, thus requiring evaluation of the programs. Evaluation procedures that have particular significance for districts with special class programs at the elementary school level include informal evaluation, measurement of pupil achievement, longitudinal followup studies, and appraisal by outside observers. Evaluation techniques are still undeveloped for measuring changes in intellectual functioning and evidence of talent development; these techniques are specific goals of the special class program.

Informal Evaluation

Informal evaluation of what pupils learn in a program is provided mainly by teachers as they summarize a school experience, administer self-devised examinations, and assess the accomplishments of the pupils in a block of time. The cognitive and affective residue of a teaching experience will determine to a large extent how the teacher will approach new lesson situations.

Some examples of teacher evaluation techniques used in the demonstration centers were culmination discussions with the whole class, examinations that attempted to find out whether thinking abilities had been extended, and the teacher's own reflections on the successes and failures of a session.

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[1] Educational Programs for Gifted Pupils. A report to the California Legislature Prepared Pursuant to Section 2 of Chapter 2385, Statutes of 1957, by the California State Department of Education. Roy E. Simpson, Superintendent of Public Instruction; Ruth A. Martinson, Project Coordinator. Sacramento: California State Department of Education, January, 1961.

In special classes, the continuous evaluation of what is being learned by individual pupils determines each new step the teacher plans. Gifted pupils are extremely perceptive and helpful in planning with the teacher to accomplish their private goals.

Measurement of Pupil Achievement

One of the outstanding contributions of the State Study was the careful selection and testing of controls for the experimental pupils so that the effects of the special class program on pupil achievement could be measured. Gains could be determined because the group tests used, Sequential Tests of Educational Progress (STEP), had adequate ceilings at the grade levels used to give pupils a chance to show what they knew about the subject areas tested. No evaluations comparable to this study were made in California Project Talent; however, longitudinal evaluation -- a design not feasible in the State Study -- was made in the demonstration center in the Davis Joint Unified School District. An outside observer-consultant evaluated the demonstration at the Lompoc Unified School District.

Estimating Reasonable Gains

In research projects for gifted children, one expects progress in academic achievement to be shown. Therefore, one question for the evaluator to consider is: "How much more than average achievement should be expected?" When a district is limited to its own pupil population, no control group may be available for comparison, or professional sensitivities may tend to prevent this type of comparison. One technique that may be used compares each pupil's achievement with his potential for achievement. For example, a pupil whose IQ is 150 should show achievement gains 1-1/2 times the national norms for his age group. If he does, his program may be considered, based on this criterion, to be adequate to his potential. The calculation involves (1) conversion of the IQ to a coefficient by dividing by 100; (2) adjustment of mean, or average gain indicated in the norms, either national or local; and (3) comparison of the pupil's score with the adjusted norm.

For example, pupil A has an IQ of 147. His STEP scores were 275 in October in grade five and 287 in October in grade six. STEP-adjusted scores are calculated to represent gains of 5 points each school year, or 0.5 point each school month.

(1) (IQ of) 147 ÷ 100 = 1.47

(2) 5 × 1.47 = 7.35 (expected gain)

(3) 275 + 7.35 = 282.35 (expected score)

287 - 282.35 = + 4.65 (achieved gain beyond expectancy)

On the standardized achievement test, pupil A made gains greater than expected on the basis of his ability. Algebraic addition of the gains and losses of the children in pupil A's group completes the results on this type of evaluation criterion. Grade placement scores may be calculated by the same steps. A single standard score may be used to estimate the achievement status of a pupil with a high IQ at any given time.

This type of calculation was used by Breidenstine in his investigation of the effect of ability grouping upon academic progress of pupils in school.[2] Gowan suggests that the estimated achievement of the gifted pupil, based on IQ, offers guidance as to whether the pupil's actual achievement meets his potential.[3] In using such a yardstick, the teacher should remember that no group data should be applied to the individual unless the data fit. The achievements of gifted pupils in the special classes of California Project Talent have not been evaluated in this manner. Such a study might furnish interesting data, provided tests with proper ceilings were utilized.

Intrasubject Comparisons

Evaluation of the special class within the school district may require an assessment of the relative effectiveness of the program in different subject areas. Perhaps upgrading of the materials and the instruction should be undertaken in one area or in one subject at a time. Perhaps the need is to discover whether pupils are making greater gains in mathematics in the team-teaching situations or in the self-contained situations; or to discover how the gains in reading compare. An instrument like STEP is useful for making intrasubject comparisons because of the separate batteries for the different subjects, the high ceilings, and the norms for comparing a pupil's achievement with earlier forms of the tests.

Longitudinal Followup Studies

At least one systematic, district level evaluation was conducted in Davis annually. This evaluation occurred when the continuation of the program was reviewed or the participating staff conferred on ways to improve the program. The purpose here is to describe the use of surveys and interviews in measuring the effectiveness of the Davis program from the point of view of the pupils, their parents, their teachers, and the counselors. Data are included from two studies: (1) a survey undertaken by the research project consultant of three groups of former special class pupils who attended junior high school at the time of the study; and (2) a series of interviews conducted by the school psychologist with all grade eight pupils who were former special class pupils.

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[2] A. G. Breidenstine, "The Educational Achievement of Pupils in Differentiated and Undifferentiated Groups," Journal of Experimental Education, V (September, 1936), 91-135.

[3] John Curtis Gowan and George D. Demos, The Education and Guidance of the Ablest. Springfield, Ill.: Charles C. Thomas, Publisher, 1964.

Survey of Pupils from Davis Special Classes[4]

The purpose of the survey was to study the scholastic progress, the attitudes, and the behavior in the school setting of pupils who had participated in a special class for academically superior children. Multidimensional data were gathered for use in giving direction for improving articulation of elementary and secondary programs for gifted pupils, enhancing the special programs at both levels, and assisting with individual educational needs.

Information was requested concerning 58 pupils who had participated in the "high achievement potential" program in grades five and six. Included were 8 girls and 4 boys in grade seven, 9 girls and 13 boys in grade eight, and 9 girls and 15 boys in grade nine. Reaction sheets were sent to parents for comment on the elementary special class and for assessment of their child's particular interests, attitude toward school, and present educational needs. In addition, junior high counselors provided data on group ability and achievement tests, grade-point averages, and their own ratings of each pupil on ten attitudinal and motivational characteristics. Junior high school teachers rated each pupil on 13 items concerning classroom attitude and behavior. The pupils themselves responded to an interest and activity questionnaire and reacted to open-ended statements related to school and learning.

Findings. Inspection of the accumulated data for each pupil yielded fruitful material for aiding guidance personnel in educational planning. Although it appeared likely that most members of this selected group would flourish in a strong college preparatory program, indications were that some individuals might require special provisions to realize their academic potential.

1. Parent reaction -- Parents of 9 pupils in grade seven, 12 in grade eight, and 18 in grade nine returned reaction sheets. Although it was not known whether parental response for the remaining 19 pupils would be comparable to those returned, a representation of 67 percent provided a basis for approximation of parental viewpoint. Not every pupil was rated on each item.

   Of 406 ratings only 6 percent were "unsatisfactory." Two items on which no unsatisfactory ratings were indicated were "ability to find information" and "curiosity about learning" (Table VI-1). Six items received a sizable number of "outstanding" ratings: (1) ability to think things through; (2) knowledge of subject matter; (3) interest in school; (4) ability to find information; (5) ability to work alone; and (6) enjoyment of learning.

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[4] Louise M. Bachtold, Survey of Former Students in Special Classes, California Project Talent. Sacramento: California State Department of Education, 1964 (mimeographed).

TABLE VI-1

Number of Former Special Class Pupils Showing Selected Characteristics as Rated by Their Parents

	Number of pupils receiving rating		
Characteristic	Outstanding	Satisfactory	Unsatisfactory
Ability to think things through	13	21	2
Knowledge of subject matter	18	19	1
Interest in school	16	20	1
Ability to find information	16	20	0
Ability to work alone	12	22	3
Liking and respect of other students	5	26	4
Enjoyment of learning	17	18	2
Curiosity about learning new things	11	26	0
Ability to accept responsibility	8	27	3
Knowledge of strengths and weaknesses	7	27	3
Willingness to do work as a leader	5	26	7

Although the majority of ratings were "satisfactory," comparatively few ratings of "outstanding" were given by parents on the following items: (1) liking and respect of other students; (2) ability to accept responsibility; (3) knowledge of strengths and weaknesses; and (4) willingness to do work as a leader.

A few parents expressed concern about the segregated aspect of the high ability elementary program, questioning the effect on a child of his being "singled out." More typical were favorable comments on the intellectual stimulation, the opportunity for fuller development of potential, and the excellent junior high school preparation which were offered by the special class situation.

The following recommendations for program improvement were made. Beyond the first item, which several parents proposed, each recommendation was made by a single parent:

- Greater challenge and stimulation at junior high level
- A course in philosophy to contribute toward self-understanding
- High, short-term motivation for junior high age pupils
- More homework
- Less homework
- Square dancing in grade seven and ballroom dancing in grades eight and nine
- Reference books more readily available to junior high pupils
- More English compositions at grade nine
- More counseling on colleges and requirements in grade nine
- Spanish taught in depth at elementary level

2. Counselor reports -- Criteria on selection of pupils for the special class program became increasingly restrictive from one year to the next. This is reflected by the scores on the California Test of Mental Maturity (CTMM). Mean IQ of the groups of pupils in grades nine, eight, and seven was 128, 138, and 148, respectively.

As one would expect on a test which sampled somewhat different abilities from those that comprised the original selection criteria, the IQ scores established from the CTMM test were grouped at the high end of the continuum, but in some cases they fell below the earlier measure. The pupils in grade seven, who had been selected on a tightened criterion (130 IQ or higher on the three scales of the WISC) showed the greatest strength on the group tests.

Grade-point averages (GPA) were varied but generally strong, and they tended to be slightly higher in the high IQ ranges. Only first-quarter grades were available for the pupils in grade seven at the time of the survey. The grade-point average of this group ranged from 2.9 to 4.0, with a mean of 3.5. Records for 3 pupils in grade eight were not available, but the GPA for the other 19 ranged from 2.7 to 3.9, with a mean of 3.3. For pupils in grade nine, the GPA range was 2.9 to 4.0, with a mean of 3.6.

Since the survey occurred early in the school year, the counselor had limited opportunity to become acquainted with the pupils in grade seven; however, only one pupil was rated as not working at capacity (Table VI-2).

At the levels of grades eight and nine, most of the students were considered to be working at capacity most of the time. None was rated as seldom working at capacity. No attitudinal or behavioral problems were reported by counselors for any of the students in the survey. The only behavioral description in which more than half the pupils in a grade fell below the highest rating was "Is willing to persevere in a problem situation." On this item, slightly over half the ratings for the pupils in grade eight fell into the "sometimes" category.

TABLE VI-2

Number of Former Special Class Pupils Showing Selected Characteristics as Rated by Their Counselors

	Number of pupils receiving rating*											
	Grade seven				Grade eight				Grade nine			
Characteristic	1	2	3	4	1	2	3	4	1	2	3	4
Seems to prefer challenge of difficult tasks	5	1	0	6	16	6	0	0	16	6	2	0
Sets own high standards	6	0	0	6	14	8	0	0	17	4	3	0
Quickly adjusts to change	3	2	1	6	13	9	0	0	15	9	0	0
Has varied interests	2	1	0	9	13	9	0	0	16	8	0	0
Is sensitive to feelings of others	4	1	1	6	15	7	0	0	18	6	0	0
Seems to have the "need to know"	6	0	0	6	18	4	0	0	15	8	1	0
Treats others with respect, regardless of their status, color, or creed	4	2	0	6	10	0	0	12	16	6	0	2
Is willing to consider more than one solution to a problem	5	0	0	7	12	10	0	0	16	8	0	0
Is willing to persevere in a problem situation	5	1	0	6	10	12	0	0	17	7	0	0
Is working at level of capacity	10	1	0	1	13	9	0	0	16	8	0	0

* 1 = Usually; 2 = Sometimes; 3 = Seldom; 4 = Don't know.

3. Teacher reports -- Although the teachers' ratings were used chiefly to appraise the performance of individual pupils, the data, when grouped, indicate certain tendencies in different subject areas and at different grade levels. Data on all 58 pupils were tabulated for 13 behavioral characteristics on which the teachers indicated whether the behavior was observed "usually," "sometimes," or "seldom" (Table VI-3).

TABLE VI-3

Percent of Former Special Class Group Exhibiting Certain Characteristics as Rated by Teachers

Characteristic	Percent of Pupils Exhibiting Characteristic		
	Usually	Sometimes	Seldom
Completion of assignments	80	18	2
Participation	61	28	11
Volunteering to answer questions	56	29	15
Volunteering to express ideas	56	28	16
Ability to work independently	70	28	2
Originality in thinking	60	32	8
Estimation of own strengths and weaknesses	59	33	8
Seeming to have the need to know	58	35	7
Regard for less bright, younger, or otherwise different people	72	24	4
Respect for others, regardless of status, color, or creed	84	14	2
Willingness to consider more than one solution to a problem	67	32	1
Willingness to persevere in a problem situation	59	38	3
Leadership ability	36	43	21

a. English -- Most grade seven pupils were rated in the top categories on all items by their English teachers. Most grade eight pupils were rated in the middle category on most items. Exceptions on the strength side were "completion of assignments," "participation," "volunteering to express ideas," "volunteering to answer questions," and "originality in thinking." Most grade nine student ratings were in the top, or "usually" category, except for items on "leadership" and "estimation of own strengths and weaknesses."

b. Mathematics -- Teachers of mathematics rated the majority of the grade seven pupils in the top categories of all except three items: "ability to work independently," "originality in thinking," and "willingness to consider more than one solution to a problem" Grade eight pupils, on the average, showed less than top category ratings on 9 items and strong ratings on 4 items: "completion of assignments," "working independently," "regard for others," and "respect for others." Grade nine students received strong ratings on all items from their geometry sections and "usually" or "sometimes" ratings from their algebra sections.

c. Foreign language -- The majority of the pupils in grades seven and eight received top ratings on all items except "leadership ability" from their foreign language teachers. Grade nine students were rated less favorably on all items except "completion of assignments," "working independently," and "respect for others."

d. Science and social science -- Grade seven pupils received unanimous top ratings on "working independently," and the majority of their ratings were in the top category on all characteristics rated except "leadership ability." Grade eight pupils received the majority of their ratings in the top categories, except for "seeming to have the need to know" (history) and "leadership abilities" (science). Grade nine students, studying biology, received majority ratings in the top category on "completion of assignments," "regard for others," "respect for others," and "willingness to consider more than one solution to a problem." They received middle category ratings, primarily, on the other items.

e. Physical education -- Pupils in both grades seven and eight received strong ratings on all items. Grade nine students dropped to the middle category on only one item, "leadership ability."

Pupils were rated high most frequently by teachers on behaviors that might be described as democratic, conscientious, responsible, and open-minded; and were rated almost as highly on participation, originality, self-insight, motivation, and perseverance. Over half of the students received strong ratings on volunteering to answer questions and express ideas; however, it is of interest to note that almost as many appeared not to contribute in this manner. Relatively few high ratings were given on showing leadership ability.

4. Pupil reports -- When pupils were asked in their questionnaires to indicate favorite subjects, they mentioned academic subjects more frequently,

although the choices of some were arts, crafts, or music. Typically they expressed a strong liking for school, concern about obtaining high grades, pleasure in challenging work, and respect for the value of education. On the open-end question of what they liked best about school, most mentioned extracurricular group activities -- meeting people, serving on committees, and student government -- ahead of library reading or experiments. Least liked about school (junior high level) were long, involved assignments, amount of homework, too little time between classes, and long lectures. The patterns of interests and attitudes were extremely diverse. The interviews held one year later indicated this diversity also.

Summary and recommendations. This survey was part of the evaluation of the scholastic progress, attitudes, and behavior in the junior high school setting of students who had participated in an elementary school special class for academically superior students. Four different questionnaires were designed for four groups surveyed: parents, counselors, teachers, and the 58 pupils who were involved. The data proved useful in planning for individual pupils, and some of the findings had implication for the future conduct of the program in the district.

Reactions of the parents indicated satisfaction with the elementary special class experiences and with the current educational provisions for their children as well. Although the suggestions represented individual opinions, the following ideas might be considered for possible future implementation:

- Junior high school course in philosophy
- Easier access to library resources
- Counseling on college requirements for grade nine students
- Physical education programs in square dancing at grade seven; ballroom dancing at grade nine

Knowledge of subject matter, increased interest in school, enjoyment in learning, and independence as students were viewed by the parents as outstanding results of the program.

Counselors' appraisals, based on ability scores and grade-point averages, indicated that only one pupil in this group was working below capacity and that no pupils were having attitudinal or behavioral problems.

Teachers' ratings obtained during the junior high school year showed that pupils from the elementary special class were considered very strong in completion of class assignments and respectful of people with ethnic differences. Although they were rated as relatively weak in leadership abilities, this finding was not viewed as cause for concern by project evaluators. Louise M. Bachtold reported:

> Studies of eminent persons and those who have made creative contributions...in science as well as aesthetics...revealed a history of independence in thought and action, a rather strong tendency away from group orientation

on the part of creatively productive people. It therefore seems probable that leadership in the realm of ideas and innovation may not be a characteristic which is identical with the trait most often observed in the school setting as "leadership ability." Although it should not therefore be concluded that those students who show social leadership skills at this age will not do the same in maturity, it might nonetheless be well to reserve judgment on the reserved, the more socially aloof adolescent.[5]

Pupil reactions indicated diversity in subject matter preferences. Although scholarly subjects were mentioned most frequently, breadth of interest was shown by pupil choices of courses in arts, crafts, and music. A strong liking for school, concern over obtaining high grades, pleasure in challenging work, and respect for the value of education were expressed. Most students revealed a strong need for social interaction through extracurricular activities. The most disliked aspect of school was homework. A comprehensive study of the extent and nature of the homework assignments was recommended. It would appear illogical that students who enjoy learning, respond positively to challenge, and who desire good grades would find homework an area of such serious concern. It should be possible to design homework which would be purposeful to the students, foster academic progress, build sound study habits, and still not require excessive time. Supplementary to these considerations, it might be advisable to coordinate subject area homework assignments; i.e., designation of specific days when the various subjects would be assigned.

Interviews with Former Special Class Pupils

The school psychologist who serves the junior high school in the Davis Joint Unified School District prepared a series of open-end questions and conducted interviews with all 13 students who had participated in the elementary special class during grades five or six or both. A summary of the written responses of eight girls and five boys was prepared by the writer. Each of the first nine questions is reported as presented to the student; a tally of the positive and the negative responses is given; and examples of positive and negative or qualified responses are transcribed in full. The purpose of including the precise language of the subjects is to indicate their level of expression, their direct attack on the questions, and the wealth of ideas they offered to teachers and administrators. Care was taken to include each subject in the full replies.

The answers to Question 10 show highly favorable comments emphasizing the strong factors of the program.

Question 1. Did the HAPS[6] class help you learn to think things through for yourself? Are you able to use this ability now? Tally, 11 yes, 1 qualified, 1 no.

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[5] Ibid.

[6] High Achievement Potential

Yes (Number 6, boy): I think HAPS helped me immensely in this field. I could never before work and enjoy knowing that it was my own work, not an encyclopedia's. When I did my own work, it boosted my morale and willingness to work. I have always been able to think things out, but HAPS I guess improved this. If HAPS did this for me, I think it's pretty great.

No (Number 13, boy): I think the HAPS program didn't help me much in this area. When I entered the class I could think things through pretty well. I can still do this now but not as much. The actual program did very little about this. I really developed it on my own.

Question 2. Do you feel you were able to go further into subjects than you would have in regular classes? Is this true since you left HAPS? Tally, 10 yes, 3 qualified, 0 no.

Yes (Number 5, girl): Since the class had no very strict schedule, we were able to cut down on some subjects alternately and build up others for our own enrichment. I recall the time I spent in the school before HAPS, and I always thought that they were limited because of the bells ending and starting the periods. We often used a whole day on one subject for a little extra sidelight that usually helped us all understand the problem or course more fully. Also, we were helped in this by the fact that we were small and did not have to spend time with "slow" students. We all were able to get more out of it this way. Being in the junior high now, I am again going by bells, but the teachers do try to offer added material without sticking closely to the course outline. I suppose the students include it as part of their duty to realize that the teachers can't do everything. There are only a few that are conservative about what they think children should do in a class.

Qualified (Number 11, girl): In the HAPS class I think that we sort of skimmed over the essentials in some subjects. We also went deeper into some more interesting subjects. Math is harder for me now because I never learned the times tables very well.

Question 3. Did your interest in school increase because of HAPS? Has this interest continued, diminished, or grown? Tally, 8 yes, 5 neither.

Neither (Number 7, girl): I had always held an interest in school, because I always like to do better than others. This is a bad habit, because soon it will be impossible, what with individualized interests and abilities that grow with education and maturity. In HAPS this interest continued, but I had to strive harder. Now my interest in school has decreased. After HAPS, the individualized attention, and the interesting subjects and people, junior high has been boring in the sense of interest even though I learn a lot. This is probably one of the defects that has affected my life most. I am bored in all my subjects except Algebra and PE. In these subjects I have to try harder. In PE I can practice and see improvement clearly and there are so many things that with practice I could do. Besides this, it is fun and not hard work. I go in every noon and often after school to work out. Algebra is not too fun and is hard, but I am continually learning new things and applying them. English and History are mostly boring, though the teachers are interesting. Homemaking is just the opposite. I don't think this belongs on this paper, but I like to write things down. I like to see my thoughts as definite ideas and look at them impartially.

Question 4. Did you enjoy being all day with students who had abilities similar or equal to yours? Did you all seem mutually to understand each other in ways you had not understood others before or in ways others had not understood you? Tally, 7 generally favorable, 4 mixed attitudes, 2 generally unfavorable.

Generally favorable (Number 7, girl): In school before HAPS I found I had adjusted to the different abilities of students around me, and the other students' interests had integrated into mine. Though my school work was different from that of others, my interests were really the same. In HAPS I found that many students had not made this adjustment. They were sometimes more mature and other times had let their interests go to pot, concentrating on the school work they excelled in. I don't think we mutually came to understand each other except in one way. In regular classes I had sometimes come to be looked on as an "egghead" and different. In HAPS I learned that most of us had had this problem. In HAPS I did not try to play down my abilities in school so as to conform because the "average" person now was up to my ability and the trend was not to be average but to excel in studies. Now, in junior high I try not to show off my abilities and not act too intelligent as long as it doesn't affect my school work. At my age I am trying to conform with others, which I suppose is sad and I hope to outgrow this feeling. However, I think there is hope for me because I realize I am different (as everyone really is) and know this is an asset.

Mixed attitude (Number 2, girl): Yes and no. It was nice because you had more of a common bond, same thing to start off with. Also we worked together very closely in ways resembling a large family, because everything was very informal. We had problems with our relations with other classes but nothing very serious. Also, being with people all day during the school year, you either became very good friends or enemies. In junior high, you don't have as much opportunity for getting to know people because you are always running around. The friendships I formed in HAPS are some of the best.

Generally unfavorable (Number 4, boy): Actually, none of the students participating in the HAPS program at the time that I was had interests that were very similar to mine. Most of them were much more interested in the chemical sciences and language while I was mainly interested in the life sciences and history. Since there was only one other boy in my grade in the class, I didn't make many friends, and I don't think that I understood or was understood by anybody that year any better than I ever had before.

Question 5. Did learning seem more enjoyable in that setting than it had been in the past? Has this continued? Tally, 10 yes, 1 same, 2 no.

Yes (Number 8, girl): Yes, because we did things that were out of the ordinary. Instead of just reading and discussing a subject, we would do special projects for them. As a good example, instead of just learning about or memorizing the geography of South America, we were able to change the borders of the countries there to the best advantage for each one. This was not only much more fun, but it made us want to search further and further for information. Since then, learning hasn't been as much fun, but it still isn't considered all work, at least, not by me. Other examples of this are letting us have two newspapers -- one on a bulletin board, the other a semiannual one on paper. We were also required to write a book, illustrate it and bind it. We were given the opportunity to put on plays or skits either of our own creation (fiction) or as a way of orally presenting information we had obtained about a certain topic.

No (Number 4, boy): No. It definitely didn't! One important reason was that I didn't know anyone and another reason was that I am lazy and HAPS is not very enjoyable for lazy people since most of the assignments require at least some extra work to get even a fair grade. And you were under much more pressure to get good grades. In fact everyone seemed to think that just because you were in HAPS you ought to get straight A's. As a matter of fact there were plenty of people who weren't in HAPS who got better grades than I did. As for continuing I am just as lazy as I was then and maybe lazier.

Question 6. Do you feel that your curiosity for learning new things has grown? Tally, 9 yes, 4 neither.

Yes (Number 7, girl): I've always been interested in new things, but did not try to satisfy my curiosity fully until HAPS. There we had a chance to explore new fields such as logic. Also our counselor introduced some experiments in psychology that opened up a new field. My curiosity has continued to grow, but now I have to fulfill it by myself. I became interested in the relatively new science of handwriting analysis and read some books on the subject. I also took an interest in reading plays to myself which my teachers help me with. I think in this purpose HAPS thoroughly succeeded. Also I think that as a person grows older and observes the world around him his curiosity grows naturally as does his courage to follow his curiosity and try new things.

Neither (Number 9, girl): I've found that my curiosity for learning new things probably wasn't affected. I mean that my curiosity to learn new things has grown, but I don't think that the program really would or has affected it in any way.

Question 7. Because of your HAPS experience, do you feel you have improved in your ability to accept responsibility? Tally, 10 yes, 2 neither, 1 no.

Yes (Number 1, girl): Yes I do. This class gave you the chance to take on more responsibility and so you learned to accept it. In the class you were left to do more things on your own and so you had to accept these responsibilities or else you were sunk. You were able to take more responsibility in the running of the class, too. We had to take responsibility for our newspaper, for the running of the club meeting, and for the committee work we did. If we did not accept these responsibilities, parts of our class would not have been as good as they were and we did not wish this to happen.

No (Number 3, boy): In HAPS our teacher allowed us to turn in assignments late and get credit. No reasonable excuse was needed, nor was one given. I feel that this tendency allowed our sense of responsibility to deteriorate, but our teacher made frequent attempts to get us caught up, but to no avail. I feel that my sense of responsibility has been reconstructed, but I am basically a bit irresponsible anyway, so I'll never completely become a very responsible person.

Question 8. If your HAPS experience helped you become a leader, have you had the opportunity to put your leadership ability to work here? Tally, 7 yes, 2 qualified, 1 neither, 3 no.

Yes (Number 2, girl): It helps you to become a leader but with 900 students in this junior high, the pressures are greater against becoming one. In HAPS I was president of the class; in junior high, there are so many potential leaders that you really have to push to become a leader. Mostly I content myself with leading in small ways in school, such as explaining math, and so forth, and being sympathetic to other people. I do more leading out of school than in. I feel more comfortable when the situation is smaller, with things more on a person-to-person basis.

No (Number 10, girl): I didn't become a leader and I'm still pretty introverted, but I think it helped me in speaking out.

Question 9. While you were in the HAPS class, did you become interested in any vocation? Are you still interested in the same one? Have you made a vocational choice now? Tally, 10 yes, 1 qualified, 2 no.

Yes (Number 10, girl): I have always had an interest for math and it probably grew during HAPS with all of the working with numbers, geometric shapes, and logic. So I thought I might be a math teacher. Since then I have made another choice. Now I think I'd like to be a computer programmer. My interest has changed more for this than teaching.

Yes (Number 12, boy): HAPS did interest me in current events and what went on in the world. Right now U. S. History is one of my best subjects. I either want to be a lawyer and go into politics or become a psychiatrist.

Qualified (Number 2, girl): I didn't become interested in a vocation while I was in HAPS. I have been interested in several areas since I was young. HAPS stimulated my interest in these areas. I have always had a love for animals and people, especially little children. I haven't decided anything more specific than this, but I intend to try and sample as many as possible.

Question 10. What do you feel are the strong points of the elementary special class? What do you feel the weak points are? How would you improve the program? The answers to this question are analyzed in detail. The number in parenthesis following each item is the number of pupils making the comment.

1. Attitudes toward curriculum
    - a. Strong points: more interesting and stimulating (10); advanced or accelerated content (6); greater depth (5); variety and enlargement of subject matter (4); work at full capacity (4); individualized, studied on own (3); more materials and books (2)
    - b. Weak points: not enough basics -- grammar, Spanish, math (5); lack of grading system (2); too many activities grouped on Friday (2)
2. Special features
    - a. Cited as favored: choice period (8); student government (7); world affairs (8); logic (3); science experiments (3); speaking and discussion (2); art and drama (2); foreign language (2)
    - b. Cited negatively: combination of two grades (2); not enough freedom to read (2); not enough experimental work in science (2)
3. Personal development
    - a. Strong points: encouraged creative ability (7); developed responsibility (7); increased understanding of self or others (6); higher ideals, interest in learning (4); good study habits (3); strengthened learning abilities (3); met and made friends (3); formed ideas and opinions of my own (2); set goals (2); developed leadership (2)
    - b. Weaknesses: prejudice of schoolmates toward special class students (4); separation from other kids (3); makes you seem different (3); hard to make friends (3); classmates tended to group (2)
4. Classroom climate
    - a. Strong points: leeway in schedule, time to think and create (6); classmates with same aptitudes, interests (5); atmosphere for learning, problem solving (4); cheerful atmosphere, teacher kept spirits up (3); teacher gave everyone a chance to take part (2); good sportsmanship -- everyone did it (2); everyone did his chores -- just expected, nothing said (2)
    - b. Weaknesses: too great a load for teacher, not enough time for individuals (3); too many subjects for one teacher to know (2)
5. Recommendations: improve relations with other classes, more contact, no special names (6); more drill -- in math, language, grammar (3); have another teacher or separate grades to relieve work load (3); give grades, lower grades for those who don't finish on time (2); student

could become expert, help other students (2); space activity and club periods through the school week (2); encourage students to broaden interests (2); more equipment and books (2)

No attempt was made in this analysis to compare the frequency of favorable against negative responses. As an evaluation procedure, these responses from the pupils provided from the pupils themselves attitudinal data which were not secured by any other approach. The pupils, who had been away from the special class for two to three years, discussed the experience with perspective and clarity. Some of the points they made repeatedly were the following:

- Gifted pupils at preadolescence and adolescence are deeply concerned with making and having friends; they wish not to be set apart.
- The special class provided an atmosphere for learning, a favorable climate for intellectual talent to flourish, and a level of academic and creative work that excelled that of the regular classes.
- The challenge of any educational program for gifted children is to provide a unique program while keeping pupils in the mainstream of student affairs.
- Gifted pupils made no protests about the difficulty of their work in the special class, but some commented that their work might have been more demanding or pursued in greater depth.

Appraisal by Outside Observer

The function of analytical observation as an essential part of evaluation is discussed in detail in Chapter 5. This type of evaluation was selected for the final report of the Lompoc demonstration center special classes. Ronald L. Hunt, Special Consultant to California Project Talent, observed classroom work in terms of the objectives formulated by the district and reported his analysis of the program to the district. The fundamental role of the consultant is to use his experience and specialized knowledge in identifying needed modifications of functions, responsibilities, operations, or relationships in an organization or among individuals. He may also be asked to recommend necessary modifications and tell how they can be implemented.

A consultant requested to conduct an analysis of a program by an outside agency has immediate limitations imposed by the nature of the consultancy. The opportunities to bring to the surface available knowledge about the program (which is in the possession of persons within the organization) are reduced by the chance that the disclosure of areas most in need of modification may reflect unfavorably on the institution to be examined. A second limitation is that analysis of a program by direct observation will seldom qualify from an empirical standpoint. Few bases exist for the standardization of observation. The observation of a program by a single consultant must necessarily place the burden of the analysis on the observer's judgment, and judgments are generally based on small samples observed over brief periods of time.

With these limitations noted, however, a number of definable characteristics of the program can be reported, and an appraisal that is based on these characteristics may prove of great value to the district that is sincerely dedicated to providing the best educational program possible.[7]

The following questions on objectives, organization, curriculum, personnel, affective areas, and evaluation are to be considered in the analysis of a program for gifted children; these are based upon those used by Ronald L. Hunt in his appraisal:

District Objectives

- Are the general objectives for the district's program convertible to classroom practice through the statement of intermediate steps?
- Do the objectives indicate a philosophy receptive to innovation and change?
- Do the objectives stress a program that is learner-centered rather than teacher-centered?
- Do the objectives state the means by which they may be obtained?
- Do the objectives encourage individual research and individual scholarship?
- Do the objectives promote use of community resources and the participation of parents?
- Do the objectives specify the criteria for the selection of teachers?
- Do the objectives encourage special counseling services for the gifted pupils in the special classes?
- Do the objectives indicate how the total educational environment can provide for such needs of the gifted child as the following:

    1. Development of creativity
    2. Allowance for error
    3. An atmosphere of intellectual honesty
    4. Free expression of ideas
    5. An opportunity for the pupil to follow his own interests
    6. Self-evaluation by pupils
    7. Development of criteria for self-evaluation
    8. The learning of a body of content not usually covered in the curriculum at the pupil's grade level
    9. Association with his peer group
    10. An opportunity to strengthen weaknesses in fundamental skills

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[7] From a report by Ronald L. Hunt, Associate Director, Brooks Foundation, Santa Barbara, California.

11. The development of independence in the pupil's quest for an education
12. The development of a thirst for knowledge
13. An increased sensitivity of the pupil to his environment
14. The development of leadership qualities
15. The development of higher intellectual processes as defined by Benjamin Bloom (and others), J.P. Guilford, or Jerome Bruner

Organization

- Is the organizational pattern adapted to the conditions of change?
- Do provisions exist for flexible grouping and adequate use of both large and small groups?
- Does the classroom organization provide for the treatment of individual differences?
- Has provision been made for cooperation from the district pupil personnel and curriculum services?

Curriculum

- Does evidence exist that the teaching methods and materials are appropriate to the advanced capabilities and the individual needs of the gifted pupils?
- Are adequate teaching and research materials, including basic, supplemental, and audio-visual materials easily available?
- Is individual study encouraged?
- Does the curriculum provide for mutual stimulation of gifted children through attitude, questioning, and emphasis on quality of thinking? For self-evaluation and self-pacing?
- Are innovative practices being used, such as inductive and deductive methodologies of teaching and learning, discovery techniques, and development of levels of intellectual functioning?
- Does any evidence exist that attention to higher intellectual processes and working with curricula designed for the understanding of structure, such as the SMSG mathematics, has resulted in a drop in skill areas?

Personnel

- Have the special class teachers been selected according to the traits and techniques that are especially applicable to the gifted group?
- Are adequate inservice opportunities being provided in gifted child education for the professional growth of personnel?
- Does the district encourage freedom and responsible innovation on the part of teachers, coordinators, and consultants?

- Do the teachers jointly provide competencies in the various subject areas?
- Is the personal and professional well-being of the heavily burdened special class teacher being guarded? Is the teacher provided with adequate assistance in curriculum planning by other district personnel and consultants?
- Are teachers aware of individual differences and the vast range of abilities and achievement of gifted children?
- Does evidence exist that successful innovative practices are being communicated among teachers? Is a team-teaching organization in use?
- Does an adequate counseling and guidance program relating to the special class program exist?

Affective Areas

- Does any evidence exist that growth of personality or achievement is being threatened by placement of mentally gifted children in special classes?
- Are the children motivated and interested? Are there control problems? Do the gifted children merge well with other pupils in the school play periods?
- Is care taken to minimize the "exceptionality" of the pupil population in the gifted classes?
- Does any evidence indicate that special classes for the gifted have a negative effect on other classes in the school?
- Is the program accepted by the community, professional staff, and parents?

Evaluation

- What measures are taken for an empirical analysis of the effect of the gifted child program both on pupil achievement and personality?
- When innovative programs are initiated, is adequate pretesting done to evaluate how well the materials or new curricula advance the district's objectives for the gifted program?
- Have steps been taken to discover the attitude of the pupils, the parents, and the community toward the program?

Changes in Intellectual Functioning

One of the major purposes of the special class program is to improve the quality and flexibility of children's thinking. If this is a goal of the program, ways must be found to evaluate the intellectual functioning of the children.

Ample evidence is available to support the idea that gifted children are more versatile and more competent in their thought processes than are their age peers, but it is extremely difficult to evaluate the effects of a program on intellectual characteristics. Educators need to devise instruments to measure these effects by methods that are less expensive, in terms of specialist services, than is direct observation. Most of the tests in use were not designed to sample the different intellectual operations which became known through psychological research by Guilford and others in recent years.[8]

A model for expanding the intellectual operations was proposed by Guilford, and evidence of the existence of these intellectual factors was verified in his statistical research. His interpretation of the intellectual processes of cognition, memory, divergent and convergent production, and evaluation are defined in the author's report on acceleration programs for the intellectually gifted. The extent to which changes in intellectual functioning occur through learning has not been established. Therefore, in the education of gifted children one of the important breakthroughs needed at this time is a test of the hypothesis that direct teaching will influence the cognitive style of gifted children.

One system of direct teaching which is currently being tested is Sara Lundsteen's project to encourage a shift in children's thinking from concrete through functional to abstract thinking. She is using a multimedia approach to children's literature in an attempt to effect change in her experimental classes. Control subjects will be tested also. The data will be subjected to several treatments, including substrata factor analysis.[9] Research is needed that explores the influence, if any, of the special class arrangement over a period of years on the IQ scores and subtest scores of gifted pupils.

Evidence of Talent Development

Talent is a many-sided thing, but the present report considers only two broad forms of talent. One form -- that by which project children were selected -- is scholastic talent, a form of ability that schools prize and one that is essential to productivity in intellectual endeavors. Another form of giftedness is innovative talent, which is essential for generating breakthroughs into new intellectual and aesthetic works. This latter talent, perhaps because its emphasis is deviance, is more difficult to develop in school and is more likely to be threatening to the society of which teachers and administrators are a part. Both scholastic and innovative talent were encouraged in California Project Talent.

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[8] J. P. Guilford and P. R. Merrifield, The Structure of the Intellect Model: Its Uses and Implications. Reports from the Psychological Laboratory, Monograph Number 24. Los Angeles: University of Southern California, April, 1960.

[9] Sara Lundsteen, Kettering Foundation Project. School of Education, University of California, Santa Barbara.

MacKinnon defined creativity as follows:

> We come easily to agreement that true creativeness fulfills at least three conditions. It involves a response or an idea that is novel or at the very least statistically infrequent. But novelty or originality of thought or action, while a necessary aspect of creativity, is not sufficient. If a response is to lay claim to being a part of the creative process, it must to some extent be adaptive to, or of, reality. It must serve to solve a problem, fit a situation, or accomplish some recognizable goal. And, thirdly, true creativeness involves a sustaining of the original insight, an evaluation and elaboration of it, a developing of it to the full.
>
> Creativity, from this point of view, is a process extended in time and characterized by originality, adaptiveness, and realization. It may be brief, as in a musical improvisation, or it may involve a considerable span of years, as was required for Darwin's creation of the theory of evolution.[10]

If one accepts MacKinnon's criteria of originality, adaptiveness, and realization, the researcher has no need to distinguish between the creative individual and his product, which has many advantages for the evaluator. Special class pupils in Davis, Lompoc, and the summer programs produced creative work in quantity and quality that their teachers had not experienced in regular classes. Reasons for this were implied in the evidence the evaluators advanced in evaluating the project. For example, several pupils in the Davis program mentioned the freedom they felt in the atmosphere of the special class "to let our creativity run loose." The schedule allowed time for productive thinking and creative work in the sciences as well as in the arts.

One of the questions that should be refined and tested is the influence of direct education for teachers in the skills of recognizing and reinforcing creative effort in as many directions as the school curriculum suggests. The teacher in one special class knew, for example, how to encourage spontaneity in poetry. Contrast the following example, one of 20 excellent poems written in a single session by pupils of one grade four class, with some of the cramped attempts that some classes produce.

ODDITY LAND

Oddity Land is a land of fun,
Where lions learn to shoot a gun.
There's a red, white and blue zebra
He's politic you know.

The animals like each other,
Friend or foe.
There's a purple hippo
His name is "Blippo."

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[10] Donald W. MacKinnon, "The Nature and Nurture of Creative Talent," American Psychologist, XVII (July, 1962), 484-95.

A pink elephant who is quite grimey,
Believe it or not his name is Slimey.
There's a green rhinoceros,
He is preposterous.

And a yellow snake,
Who eats with a rake.
And a grimey ole spoon,
That came from the moon.

That something like a dinosaur
Has been in the pantry once more.
Those are some of the things in Oddity Land,
Where the birds lay out and tan in the sun.

I have to go now, but sometime
Lend me a hand,
To take care of the animals
In Oddity Land.

Most project teachers were selected for their ability to encourage innovative talent. Although much effort was given to the development of divergent production in the children of the special classes, no attempt was made to measure possible changes that might have taken place. In one class some use was made of the tests of creative potential developed by Torrance.[11] A reference was made in the Myers and Torrance publication to this use of tests.[12] The tests sampled such components as sensitivity to problems, fluency of ideas, flexibility, originality, tolerance of ambiguity, redefinition, elaboration, synthesis, and closure. Further research is needed on the relationship of such components to creative production in specific areas.

Summary

Evaluation procedures that pertained particularly to the special class for elementary schools included some techniques selected from a state study which preceded the establishment of the demonstration centers and some methods used to evaluate the demonstration itself. Further evaluative research studies have also been suggested for future educational programs.

Informal evaluation was undertaken in all special classes at all levels. Whole group discussions were used to summarize special programs. Written examinations were designed and given to indicate whether the project objectives in critical thought processes had been realized. Some teachers supplied a written report of their own evaluation of class and individual achievement at the end of a program.

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[11] E. Paul Torrance, Education and the Creative Potential. Minneapolis: University of Minnesota Press, 1963.

[12] R. E. Myers and E. Paul Torrance, Invitations to Thinking and Doing. Boston: Ginn and Company, 1964.

Measurement of academic achievement of pupils and controls, as used by Ruth A. Martinson in the statewide research that preceded legislative support of special classes for gifted children in California, was recommended.

The Davis Joint Unified School District studied the effect of the special class on the pupils' achievement and attitudes by surveying the pupils, the parents, the teachers, and the counselors at intervals following the children's participation in the program.

The Lompoc Unified School District evaluated its special class program with the help of Ronald L. Hunt, special consultant, who met with administrators and observed the classes involved in Project Talent.

A major goal of the special class program is to improve the quality and flexibility of children's thinking. Further research is needed to develop economically feasible methods for evaluating intellectual change that reflects a child's opportunities at home and at school, so that results of programs may be determined more accurately.

Children were selected for participation in the special classes in accordance with scholastic talent criteria, but the curricula were developed to stimulate their innovative talents, also. Pupil products and reactions were used to support otherwise unmeasured results of this effort.

Chapter 7

Recommendations

One of the distinct advantages to the reporter of the educational research demonstration project is the opportunity in this kind of project to interpret experience. Some of the most significant events of the special class experience were not anticipated. Each research project consultant assumed the responsibility for particular phases of the work. Recommendations enumerated in this section are based upon reported research, numerous conferences, classroom observations, visits to districts, structured interviews, and test data. Another reporter might have selected different demonstration project experiences as significant.

Administrative Operation of Programs

Any arrangement that takes the child away from his own school community is likely to develop concerns in many parents, with the possible exception of those whose children are conspicuously different from their peers. Any organization that sets a gifted child apart from the "other kids" is likely to create problems for the child. Most children in the special class surveys wanted the stimulation of classmates who were unusually competent or creative; however, they wanted to avoid labels and to participate in whole-school events. The special class in the elementary school has a reasonable chance to survive if the teachers are carefully selected, the children are kept in their own school communities, and the program is operated inconspicuously.

Considerations in respect to administration include the following:

1. A district should explore the possible use of flexible scheduling and nongrading as organizational means of achieving more effective individualization of instruction.

2. Administrative tasks might include the development of team-teaching techniques with the employment of teacher aides.

3. Emphasis should be placed on adequate testing of innovative programs.

4. Specialized pupil personnel and curriculum coordination services should be provided for the program for gifted children.

5. Concerted effort should be made to involve gifted pupils in the life of the school as a whole and to avoid complete separation from other classes. In the project, pupils suggested that special opportunities be given to other classes so that their own program would seem less

conspicuous. These opportunities could include choice of a free period, unusual approaches to the study of world geography, and experimental studies in science. The special class pupils enjoyed organized games, interroom activities, and participation in student government as ways of being involved in the total school program.

Pupil Nomination and Selection

The basis for assignment of pupils to the special classes in California schools has been intellectual ability as indicated by IQ. Although this decision was logical in terms of the relative stability of the measures used and the known relationship between IQ and school success, recent knowledge of the nature of talent and productivity suggests that criteria be broadened to included the selection of pupils who need a unique program, one not available to them in the regular class.

Considerations in respect to selection of pupils for special classes include the following:

1. The basis for pupil selection should be broadened to include children with unique and creative abilities.
2. Children with unusual success in school achievement should be considered for special classes, particularly when their IQ falls within the error of the measure (SEm).
3. Each decision about an individual's educational placement must be weighed against the considerable disadvantages to the atypical pupil of pursuing a typical curriculum.

Curriculum Adaptations

Changes in curriculum content seem initially to be necessary, obvious, and easy. However, very few parents, coordinators, teachers, administrators, or legislators have any conception of the highly gifted child's level of thinking unless they have observed a special class in which the functioning level of the pupils has begun to approach its potential. Most adults do not envision the extent of materials and content needed for a special class program. Typically, gifted children complained about routine homework but asked for more stimulating rather than easier content. Both acceleration and enrichment of content are needed in all subject areas.

Considerations in regard to curriculum and resources for gifted pupils include the following:

1. Perceptive teachers and analytical observers of classroom interaction should work together to determine the full range of pupil ability within the special class.

2. Most of the program should be geared to levels much higher than curricula in a nonsectioned class. Available materials should range from grade level to double the grade level in stimulation and difficulty.

3. Every possible advantage should be taken of community resources and personnel. Teachers and district staff should describe in specific terms the kinds of human and materials resources needed in the program for gifted children.

4. District and building collections of instructional materials should be developed under qualified supervision. The effectiveness of the collected materials should be reviewed and reported by and for all teachers in the program. Teacher and pupil produced instructional materials should be evaluated, reproduced, and made available to other teachers in the district. Professional assistance should be utilized in the preparation of local materials.

Individualized Instruction

Adaptation of curriculum and instruction to individual needs enables the school to regulate the learning to the pupil, whether he is enrolled in regular or special classes. The essential difference between the special class and the regular class is that in the special class most instruction can be geared to a high level and most pupils are able to do a great amount of their work independently. This enables the teacher to use individual conferences to analyze learning needs and to discuss individual goals with her pupils. When suitable materials are provided, the pupils are enabled to conduct special studies individually or in small groups. A typical gifted pupil in the special class uses about four times the normal amount of library materials, science equipment, learning laboratories, programmed courses, and other instructional material.

Considerations in respect to individualizing instruction for gifted pupils include the following:

1. Mentally gifted pupils should be given opportunities for individual, small group, and total class planning for learning opportunities and materials. One day a week might be devoted to a program planned by the pupils with the guidance of the teacher.

2. An effective use of pupil talent in the classroom should be considered. Small group and individualized tutorial programs using pupil talent should be implemented. Teachers should put the children to work and make a concerted effort to reduce the need for lecturing. This is one means by which pupil self-instruction and self-evaluation may be instituted.

3. Simulation, or the use of games, needs to be explored as a means of improving instruction in the class for gifted pupils. The staff at Johns Hopkins University has prepared materials to simulate conditions

in international relations and career choice. Research in the use of simulation is now being conducted by the Western Behavioral Science Institute in La Jolla, California, and in the office of the Superintendent of Schools in San Diego County. The Brooks Foundation in Santa Barbara plans to initiate research in this field in the near future.

4. Special class pupils should have opportunities for counseling or advisement. Open discussion of problems common to gifted children is extremely important and usually can be conducted on an intellectual level by an interested professional adult. Often the principal, the school psychologist, or the classroom teacher can schedule a regular time to divide the class for group discussion sessions.

Levels of Intellectual Functioning

A learning theory model used as a framework for classroom instruction is indispensable in classrooms where the goal is to raise the level of children's thinking. The school's responsibility toward the gifted child is to teach him to seek knowledge, to organize it, and to use it in creative and constructive ways.

Considerations in respect to planning and directing the intellectual functioning of children include the following:

1. The development of a test bank approximating the levels of cognition would tend to further the goal of increased intellectual functioning on the part of the gifted child. Through the process of preparing for a test bank items to be shared by special class teachers, it is possible to work toward more precise statements of educational objectives and to evaluate more effectively change in intellectual processes.

2. Teachers, curriculum staff, and personnel staff should be requested to work together on the test-bank project. A card file of test items identified by content, level of cognition, and pupil responses should be maintained. These items may be analyzed and later published for the use of all teachers in the program.

Inservice Education for Teachers

Appropriate preparation for teaching the gifted is crucial to a special class program. The teachers themselves, however, should not be required to carry the full obligation of time, money, and resources that are needed to become specialized teachers. Either the district should assume the costs of specialization or should compensate the teachers in specialized programs for their exceptional preparation. Teachers of these classes need to spend twice as much time in planning and to assemble three to four times as much material as the teachers of regular classes.

Considerations in respect to the teachers of gifted pupils in special classes include the following:

1. Minimal preparation for a specialist teacher of gifted children should be part of the licensure structure for teachers. Public support for specialized teacher education might follow the pattern of programs for specialist teachers of reading.
2. An examination of teacher traits that are applicable or not applicable for teaching the gifted should be undertaken by the district planning a special class program.
3. A long-range inservice training program should be designed around the needs of teachers. Particular emphasis in the training program should be devoted to means by which teachers may provide appropriate learning opportunities for the children under their care. The teachers of the gifted should participate in the planning of the program.
4. Effective arrangements for communication among teachers of the gifted should be instituted. This interaction should be considered an essential and continuous process of planning, and the exchange of successful and unsuccessful practices should be accommodated, encouraged, and rewarded. The teachers should be considered a large team from which subteaching teams are designated.

Evaluation of the Program

Evaluation of the special classes involves not only what the pupils learn, but the willingness of the community to continue its support of the program and of the faculty to carry the load which special programs entail. Some questions an administration must consider in advance are the following: Is the program acceptable to the community, professional staff, and parents? What measures are taken for an empirical analysis of the effect of the program for gifted students both on pupil achievement and on personality? When innovative programs are initiated, is adequate pretesting done to evaluate how well the materials or new curricula advance the district's objectives for the program for the gifted? Have steps been taken to discover the attitude of the pupils, the parents, and the community toward the program?

Sometimes programs for gifted children are initiated before procedures for evaluation are determined. At this point, the time is past for the establishment of the baselines needed for subsequent evaluations. Baselines used by the district for typical classes are inappropriate for the gifted; these include both local district norms and norms published by the test producers. One method of evaluating the gifted child's progress is his own pretest score, multiplied by his intelligence coefficient. This and other forms of evaluation are essential if a program is to survive the administrative problems that special classes create.

Considerations in respect to program evaluation include the following:

1. The teaching staff should be involved in planning and reviewing evaluation procedures. The receiving teacher has much to learn about the atypical child from the teacher who knows him well. Staff involvement in evaluation facilitates planning for the particular learning environments that gifted children need. All teachers can be expected to learn to make better adjustments to individual learners and to make valid referrals of new pupils for programs for the gifted.

2. Specific statements of objectives should be converted to teaching practices and later evaluated to determine whether the objectives have actually been achieved. The evaluation should be concerned with identification of both the behavior and the content area in which the behavior is to be achieved.

Further Research Problems

Certain areas for investigation, suggested by experiences with the special class project, are the following:

1. Comparison of pupil achievement under different program prototypes

2. Descriptive studies of the affective characteristics of pupils enrolled over a period of time in various special class situations

3. Comparative study of achievement and personality changes in special class pupils with different intelligence dimensions

4. Followup into the junior high school of articulation in each major curricular area

5. Comparative success of several methods of direct teaching to generate cognitive styles

6. Comparative studies of various techniques for direct education of teachers in the recognition and reinforcement of pupils' creative efforts

7. Replication of studies on special class grouping in which the affective sensibilities of teachers are controlled and in which teacher education is controlled

8. Comparative study of enrichment of resources -- books, materials, and personnel -- versus stimulation of pupils to develop their own resources

9. Longitudinal study of effect of special class placement on minority versus majority socioeconomic class groups

10. Replication of some previous studies limited to gifted children when teacher characteristics are controlled
11. Complete descriptions of the activities in programs that are undertaken

Curriculum Materials

Several teachers of special classes for gifted pupils contributed descriptions of study units they found well suited to the needs of pupils and valuable in outcomes. A few of these were incorporated into Chapter 4, "Curriculum Development." The three that follow are given here as they were presented by the teachers:

Biological Science Unit[1]

Purpose: To discover the basic biological needs of living things

Method: Through group discussions, we arrived at some rather crude criteria for life and raised the question, "How could we test these ideas?" We set up an aquarium and attempted to balance it. All went well until one day all of the fish died.

Experiment: We decided that somewhere the balance was upset, but the question was, where? I asked the class to devise experiments and give me a list of materials, which I filled. I got over two hundred guppies from the high school for the experiments; then left the children alone to set up a myriad of different tests, some good, some not. I posed the question of validity to them time and again until many students had designed very good, controlled experiments.

Results: After three weeks, the children with the controlled experiments unanimously agreed that a fungus was the killer, having gotten negative results on other tests. We again set up our aquarium, and not one guppy died in five months.

Conclusion: This experiment did not require a great amount of material. The children brought jars, bowls, and so forth from home. I think in turn they learned these things:

(1) The value of a controlled experiment, which they devised themselves after being questioned as to how they could be sure their experiments were valid

(2) How to generalize from many different observations

(3) How delicately nature is balanced, and the role of a parasite in nature

(4) The usefulness of mistakes in drawing conclusions

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[1] Presented by Steve Straight, Special Class Teacher at Westwings Elementary School, Lompoc.

Once we had established -- in a small way -- that life has order in that it is balanced, we moved into a new topic: the food chain. We held panel discussions and class discussions in which the main discussion topic was "Where does the animals' food come from ultimately?" This led to three subtopics:

(1) The food chain of animals
  (a) Herbivores - consumers
  (b) Carnivores - primary predators
  (c) Carnivores - secondary predators

(2) The source of plant food (nitrogen cycle)

(3) The CO_2-O_2 cycle (reviewed)

The great value of this topic was in showing the children that this earth is not a random place but an ordered one; that it exhibits cyclic patterns; and that alteration of these patterns has a tremendous effect on the whole of life. We discussed some examples of the alteration of some phase in the cycle such as the effect the glaciers had on life. We created some hypothetical situations and theorized as to the outcome. Creative essays were written on such questions as: "What would happen to all animal life if the plants on earth should all die off?" "Are carnivorous animals important in nature?" and "What would happen if all parasites died?"

Since we found order thus far, we approached the order on this earth in a taxonomic sense with respect to animals. In this unit we viewed animals, and I tried to get the children to group them according to physical characteristics; however, I was somewhat frustrated because we had too few specimens to see variations in the order and the order as a whole.

So we began with one-celled animals and worked our way up to the phyla, paying particular attention to digestion and circulation. We discovered that the more specialized an animal got, the more improvisations we had to make in these systems. After each phylum, I asked the children if they could see a direction in which these systems were going, and if they could make predictions as to what the next higher animal would have in the way of these new systems. I would give them a higher animal and ask them to invent a digestive and circulatory system that would feed all its cells, which we then would compare with the actual animal. The students' own invented systems were amazingly accurate and in some cases, where they differed from actuality, I was at a loss to explain why their animal was not as well equipped as the real one.

The purposes of this long unit were several:

1. To show a reason for animals to be as they are

2. To show that the word "animal" does not mean only vertebrate

3. To show many different animal forms
4. To show one reason some men believe in organic evolution: that there is a gradual transformation through the phyla

The door was opened to discussions of the theory of evolution. Three topics for debate were: "Origin of Earth," "Origin of Life," and "Origin of Man." I had the children debate the issues for two reasons: (1) they were excited about competing with each other so they did research on their own because they wanted to do so; and (2) they were forced to think and to justify their beliefs. These students learned to take nothing for granted, but to question and to search for answers. In my opinion, the debate was an effective way to teach because it provided a level of motivation which is hard to accomplish. The children spoke to each other in their own vernacular, which was understood. They learned to translate and simplify the ideas of others into their own vocabulary.

Science Projects[2]

Although the best science projects are seldom created according to a preconceived plan, an orderly series of steps is followed almost universally by successful students and professional scientists.

Seven Steps

1. Decide on the problem or process you want to investigate.
2. Think it through, and plan carefully.
3. Read widely. Learn all you can about your subject. Keep a record of your sources of information.
4. Talk to other people about your project. Never ask an organization to send all the material it has on a subject.
5. Set up a notebook that will include accurate records of your original ideas, good and bad guesses, notes on your readings, all of your experiments, observations, and any other useful material.
6. Begin the experiment or progressive steps of your project and establish the controls against which you will check results. If the experiments do not yield the information you are looking for, record the results anyway, and salvage whatever is useful in designing new experiments and controls. Remember that failures are instructive too. It is often valuable to know what does not work.

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[2] Presented by Martin Robeck, Jr., Special Class Teacher at Vieja Valley Elementary School.

7. Summarize your conclusions when you have repeated your experiments sufficiently often to feel sure that your results are valid. The results may be positive or negative.

Writing a Report

The following points may be used as a guide in preparing a report:

1. Title: Should be accurate but not too long
2. Summary: Brief statement of the problem and the gist of your research
3. Introduction: Reason for your interest in the problem and background information
4. Discussion: Statement about what you are investigating
5. Details of Materials: Methods or steps to be used and controls
6. Observations: Listing of what has been found out
7. Conclusions: Statement about what your observations tell you concerning the answer to your problem
8. New questions: Future experiments or plans if any
9. Appendix: Graphs, tables, photographs, drawings
10. Bibliography and acknowledgments

Long Term Science Contracts or Projects
(includes making a display)

The following list contains suggestions for long term science projects:

1. A bell system
2. A chemical change
3. A crystal radio set
4. Action of a solenoid
5. A door chime
6. Air currents
7. An electronic map of the U. S.
8. A projector
9. Measuring the ocean depts
10. Measuring outer space
11. Molding
12. Liquids as acidic or alkaline
13. Operation of a door bell
14. Parts of an electric motor
15. The arc light
16. A weather station
17. A cotton gin
18. A wheat elevator
19. Cross section of a volcano
20. Cross section of an oil well
21. Cross section of the earth
22. Heat producing electricity
23. Distillation of water
24. Power and food from the sea
25. An electromagnet
26. Expansion and contraction of liquids

27. History in shells
28. Types of fuels
29. Polar constellations
30. Principles of a transformer
31. Jet propulsion
32. The quartz family
33. Simple machines, steam and water power
34. Seed and plant study
35. Making leather
36. Fulcrum and lever
37. The pulley
38. Television
39. Telephone
40. Laser
41. Barometer
42. Chlorophyll
43. Glass and its uses
44. Study of a chemical
45. Printing
46. The human eye
47. Fingerprinting
48. Trees
49. The solar system
50. Effect of light on plants
51. The ant
52. The bee
53. The earthworm
54. A balanced aquarium
55. Ecology of school grounds
56. The chemical elements
57. Butterflies
58. Birds

Science Project Score Card

I.	Creative Ability	(30 points)	____________
II.	Scientific Thought	(30 points)	____________
III.	Thoroughness	(10 points)	____________
IV.	Skill	(10 points)	____________
V.	Clarity	(10 points)	____________
VI.	Dramatic Value	(10 points)	____________
		TOTAL	____________

For the purposes of this science fair, the project represents the total work done in investigating a problem in any field of science. This includes everything from initial thinking and planning through all the steps that lead to the final product. This final product may be a new theory, a new method for producing some desired result, a piece of apparatus, an analysis of observations, or anything else of this general nature. Each student submits a written report on his project.

Judges:

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Science Materials

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Natural History

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Kits

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Scientific Methods in Anthropology[3]

One reason for approaching the social sciences from the point of view of one discipline at a time is that gifted pupils can become involved in a limited way in the methods of scientific investigation which specialists have developed. The techniques of archaeology were observed by Lompoc Special Classes when excavations were being done at La Purisima Concepcion Mission. Historical museums throughout California have exhibits which show how the remains of Indian cultures are recovered and studied. Anthropologists' modes of investigation which gifted children might attempt are the following:

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[3] Presented by Diane Nishikawa, Special Class Teacher at La Canada Elementary School, Lompoc.

1. Techniques used to recover artifacts of past cultures
2. Comparisons of the culture in different ethnic groups
3. Sequence in the development of cultures, including radiocarbon dating
4. Studies of cities and their evolution
5. Identification of changes in culture
6. Studies of the causes of cultural change

The children will need to become aware of the challenge inherent in scientific studies of people: the complexity of social interaction, the variability between people, and the necessity for prediction as probability. A study of probability in the mathematics class is helpful at the time the class begins to consider the scientists who study people. The content of history and geography, which may need to be defined by group discussion and consensus, will be used frequently and will provide a background for studies of modern California.

A sequence or procedure for the investigations may be formulated by the class, under guidance of the teacher. The study of an ethnic group may be conducted with some group organization at the end of the unit to clarify the steps that were taken and to serve as guidelines for future studies. The procedure that follows is appropriate for problems in anthropology, although somewhat different from the procedure pupils learn to use in the physical sciences:

1. Gather information.
2. Organize information.
3. Select relevant concepts.
4. Explain the relationship between concepts (formulate hypotheses, principles, conclusions, or generalizations).
5. Correlate, or interrelate, sequences.
6. Relate present to past.

Objectives. This approach in the development of social science curricula for intellectually gifted children can be illustrated in the following statement of objectives for the unit.

Social Science Content: Generalization -- Anthropology is the study of man, how his culture evolved through interaction with his environment.

Intellectual Content: The thinking processes available to each pupil will be extended as he functions in learning situations that require the following five Guilford operations:

1. Cognition of selected concepts
2. Memory of significant information
3. Divergent production of inferences, hypotheses, graphic arts, and literary expression
4. Convergent production of generalizations which will serve the individual pupil in further scientific study of man
5. Evaluation procedures to help the pupil distinguish between what is known and what is knowable

Affective Content: The attitudes and the motivations of pupils will be influenced toward observations that minimize prejudice and toward communication that reflects acceptance of all ethnic groups as members of the human community. Certain of the goals were outlined by David R. Krathwohl, Benjamin S. Bloom, and Bertram B. Masia in Taxonomy of Educational Objectives. Handbook II: Affective Domain. New York: David McKay Company, Inc., 1956. The following goals will be emphasized, and pupil interaction will be observed as the class studies the culture of an extinct people:

1. Attending to the forms a people use to reveal their culture
2. Responding with enjoyment to the arts or artifacts of a culture which is different from one's own
3. Valuing the heritage of a written language
4. Organizing the standards of authenticity in published resources toward the end that scholarly material will be preferred to undocumented opinion
5. Revising judgments in the light of evidence

Problem	Concepts and Terms	Techniques
Why do we study people? Man?	Human Humanity	Discuss the necessity for making decisions, the fun of exploring new places and discovering new knowledge, the difficulty in studying people.
What activities set man apart from other creatures?	Communication Language Society Philosophy Art and literature	Tabulate activities that provide necessities (prepare food) in one column and activities that provide niceties (play musical instruments) in another column. Add a third column for areas of disagreement (form governments).
How many ways can we approach the study of man?	History Geography Economics Sociology Political science Anthropology Social science	Discuss what pupils remember about the content of history and geography; lead into other branches of social sciences.
How does the anthropologist work?	Observation (over an extended period of time) Participation (in the group)	Study pictures of excavations. Discuss various approaches to the study of anthropology. Compare geography and anthropology. Consider what can be learned about a group of people by living among them.

Intellectual Process	Resource or Assignment	Teacher Critique
Cognition Divergent thinking	Read Bartlett, The Study of Society.	Which children showed particular interest in the discussion of social questions? Who participated?
Cognition Memory Evaluation	Read "The Talking Dog" by Henry R. Fea.	Did pupils identify the theme of the story? (Man is part of the human family and should not identify with the animal world.) Did each realize he did not need to agree with the author? The teacher? The class?
Memory Cognition Divergent thinking	Read Grant, Rock Paintings of the Chumash, pp. vii-ix and 24-28.	List the branches of social science that were named by pupils. Note whether any was discussed at the cognitive level, e.g., which of these terms were understood as laymen might use them? Specialists?
Memory Cognition Convergent thinking	Read Curtis, Arroyo Sequoit. Read Bartlett, The Study of Society, pp. 272-327.	Did pupils understand that anthropologists study groups of people living today?

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